

1893.

QUEENSLAND.

ANNUAL REPORT OF THE DEPARTMENT OF AGRICULTURE FOR
THE YEAR 1892-93.

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TO THE HONOURABLE THE SECRETARY FOR PUBLIC LANDS AND AGRICULTURE.

Department of Agriculture,
Brisbane, 30th May, 1893.

SIR,—In submitting my report upon the operation of this Department during the past year, it is with great regret that I have to give prominence to the unfavourable weather conditions that have affected our farmers, pastoralists, and horticulturists. Upon the uplands, cold rainy days and nights at the time the wheat was in the bloom were fatal to the development of the kernel, with a consequent low average return of bushels to the acre when the grain was threshed. In the coastal districts the deluges of rain caused the ruin of the crops of both farmer and horticulturist, and were inimical even to the interest of the grazier; while in the West the drought has been the cause of the loss of many thousands of sheep and cattle. Although the losses from the above disastrous conditions amount to a very large sum of money, it must be borne in mind that when more favourable weather prevails our rich soils will give returns that will largely tend to recoup previous losses. Notwithstanding the sufferings of the farmers in the Southern coastal districts during the late floods, the crops of maize, bananas, and rice in the North promise to be most abundant. The past adverse seasons, and more especially the floods of February last, which swept the produce of so many fields into the sea and wrecked so many homes, entailed much work upon the Department in attending to the necessities of the sufferers. Judging from the experience gained in 1890, when seeds to the value of £500 were purchased and distributed, I, without awaiting any instructions from the Flood Relief Committee, wired the Departments of Agriculture in Sydney and Melbourne, asking their co-operation in the purchase of seeds for distribution, being aware from inquiries that much time would be lost before the local supplies would be available, and also knowing that the quantity which was sufficient in 1890 would be as a drop in the ocean to what would be wanted in 1893. The Departments of Agriculture in both New South Wales and Victoria willingly placed their resources at my disposal, and I am glad to have this opportunity of placing my thanks for their assistance on record. The schedules received from the Central Flood Committee show that the crops from 15,014½ acres were swept away, and that the occupiers of these lands purposed replanting 9,489½ acres, or nearly two-thirds of the area lost. This percentage speaks well of the energy of our farmers in making a fresh start after the ruin that had befallen them. From the following statement it will be seen that seed to the value of over £5,000 was purchased and distributed to over 1,200 farmers and market gardeners in 41 different districts. This distribution necessitated much extra work, the staff for a considerable time working from early morning to late at night:—

Seed purchased on account of Central Flood Relief Fund, 1893, and distributed by Department of Agriculture:

Oats	...	...	9,601 bushels	Lucerne	...	...	36,699 lb.
Barley	...	...	561 "	Panicum	...	...	2,370 "
Wheat	...	...	293 "	Sorghum	...	...	100 "
Rye	...	...	201 "	Peas and Beans	...	...	709 quarts
Maize	...	...	558 "	Other Vegetable Seeds	...	...	3,242 oz.
Potatoes	...	...	5,274 cwt.				

* Valued at £5,219 Os. 3d.

In addition to the seed supplied on account of the Central Flood Relief Committee, a considerable quantity was supplied to farmers at cost price, the large purchases by the Department, coupled with the difficulties of carriage, having so denuded the market that seed was not for some time to be obtained locally.

FACTORIES AND CO-OPERATIVE COMPANIES.—The persistent efforts of the Department, through the instruction given by the Travelling Dairies, lectures, and bulletins, are now beginning to bear fruit, as shown by the establishment of butter, cheese, and fruit-canning factories, all of which, it is satisfactory to say, have been started without the aid of a bonus from the Government. During the past year several butter and cheese factories have been established, and up to the present time are working satisfactorily. The example set by Mr. Couldery in carrying off the first prize for cheese at the last show of the National Agricultural and Industrial Association, when in competition with cheese from the celebrated

* Since this Statement was compiled, further seed to the value of more than £3,500 has been distributed to Farmers on account of the June floods.

celebrated Bodalla Factory in New South Wales, had no doubt some effect in advancing the factory system during the past year. Our farmers, and also the general body of consumers, were here taught the important lesson that the Department has been preaching since its establishment—viz., that the soil and climate of Queensland are just as well adapted to the pursuit of agriculture as that of any of the Australasian colonies, and that if the farmers will only adopt proper methods they can raise and produce a marketable article as good as can be imported. The test made by our Travelling Dairies has proved that our milk is as rich in cream, butter fat, and cheese constituents as the milk elsewhere in Australia. Our cheese can stand the test of quality and keeping properties, and, to my mind, our butter would command a good price in the London market if it were prepared in the factory, instead of as it has been up to the present on the farm, each farmer making his butter of different degrees of quality and fighting against skill, method, and capital in the factories. By the establishment of factories our local demand, which is yet large, would soon be supplied, and Queensland would be seeking a share of the markets of the world. The most satisfactory system, and the one most likely to ensure success, is that of co-operation, where every farmer who supplies milk is a shareholder and thus directly interested. Some conception of the magnitude and value to the colonies of the factory system may be obtained from the fact that Canada, which now stands at the head of the cheese-making countries of the world, supplies one-third of all the cheese imported into Great Britain. Last year a small factory for canning pineapples was established at Zillmere, and at first was successful, but, owing to the want of sufficient capital to carry on operations until the market had been obtained and established, operations were suspended, since when a further misfortune has befallen the company in the destruction of their premises by fire, so that what promised to be a profitable channel for the disposal of our surplus fruit has unfortunately come to an end. It is, however, to be hoped that the stoppage is but temporary, as, notwithstanding the disease now affecting the pineapples in the Nundah district, the area under this crop is largely increasing. The market here and in the south is limited, but outside of Australia the sale is unlimited; and as it has not yet been demonstrated that fresh pineapples can be carried great distances unless in cool chambers, there is a splendid opening for the adoption of the factory system in canning and preserving this delicious fruit. The same remarks apply also to the mango, the nature of which is against its being carried long distances in a ripe state, but converted into canned fruit it can be kept for any length of time. There is no fruit that I am aware of better adapted for this purpose, and to utilise it in this fashion would open up a fresh source of profit to our Northern fruit-growers, instead of producing an annual crop that is allowed to fall to the ground and rot as at present. It may be that the mango can be carried in a ripe state. Our knowledge of this fruit has not yet, however, reached that stage; an experiment was last season made by shipment to London per s.s. "Avoca," but on arrival the fruit was, I understand, valueless. The factory, therefore, is clearly the means by which our crops of this fruit can be made profitable. Of its canning properties I can speak from experience. I have given the subject of factories much consideration, and the more I think the more I am convinced that this is the only solution of the difficulty we are experiencing in finding a profitable market for our fruits. The long distance we are from the great markets, the uncertainty of conveying our goods in a ripe state, even when cool chambers are provided, and the knowledge that when arrived at its destination the fruit has to be quickly sold to prevent the decay which rapidly sets in, clearly shows that the most effective means must be found for the disposal of our productions, which will, I think, be found in canning. One has only to enter a grocery store to see the great change that has come over the taste of the public. On every side will be found tins and bottles containing articles of food, mostly imported from foreign countries, that were never before placed on the market in that form or condition. If these can be produced, conveyed thousands of miles, and sold here at a profit, surely we can follow in the same course and utilise our own resources. At certain seasons of the year pineapples are sold in London, I understand, at one penny the slice; at others much higher values are obtained. At these rates, we can by canning secure a greater profit than can be obtained for this fruit in the local market, and provide for a different class of buyer than those who purchase at one penny the slice.

EXPERIMENTS WITH FRUIT.—Very interesting experiments have of late been carried out by the Instructor in Agriculture to ascertain the period that fruit can be kept under different conditions of temperature. These have proved that not only could our fruit be landed in England in good condition if the necessary cool chambers were provided, but they have also indicated a solution of the difficult question of the conveyance of the banana. An effort will be made to induce one of our shipping companies to fit up their steamers with chambers specially adapted to the trade. Professor Shelton deals at length with this subject in his report. Since my last report an experiment was made in shipping pineapples to San Francisco. Unfortunately, it proved a failure. Full particulars are given in Professor Shelton's report.

IMPERIAL INSTITUTE.—There has been considerable delay from various causes in placing the Queensland Court in order to receive exhibits, the principal cause being that no scheme or system was determined upon with reference to the nature of the exhibits, and the contract for the cases and fixtures was delayed through the late floods. The decision last arrived at was to have ornamental cases of Queensland woods around the court, in which will be placed duplicates of the timbers now in the museum of this Department, so that visitors can see one source of the great wealth of this colony. This collection, consisting as it does of upwards of 400 specimens in the rough, polished, and veneer stages, has certainly no equal in Australia, and perhaps not in the world. In addition to the timbers, a case filled with agricultural products—such as all cereals, sugar, arrowroot, ginger, bananas, &c.—will be furnished by this Department. The preserved meat industry, which is finding a profitable market in London, will also be represented, a trophy of the cans of the Central Queensland Meat Export and Agency Company, Limited, having been sent home at the request of this Department to the Agent-General, the cans being all labelled, soldered up, and, excepting that they are empty, just as they are placed on the market. It is greatly to be regretted that the space allotted to Queensland is so small that it is impossible to place therein exhibits or trophies of such of the resources of Queensland that require space; as, for instance, wool, which I should have much liked to have sent; but the space allotted is far too limited to allow of an adequate display of the natural and cultivated products of the colony.

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ALICE RIVER SETTLEMENT AND BARCADDINE DISTRICT.—During the month of September last, at the request of the residents of Barcaldine, I inspected the surrounding district and also visited the Alice River Settlement. This latter, which, as is well known, is on the co-operative principle, has from time to time received considerable assistance from the Department, and I was, therefore, somewhat interested in it, and anxious for its success. A large number of the original members at the time of the formation of the society have since left, and, at the time of my visit, the farm was being worked by only a few men. The original idea was, I believe, that while one portion of the community were cultivating the settlement the remainder should earn wages by working on the surrounding stations, which were to be paid into the common fund for the benefit of the whole. This arrangement must, however, have been upset, for there are now very few in the settlement. These appear to be steady, hardworking, intelligent men, who wish to give the scheme a thorough trial. Unfortunately for these men and for the experiment, the spot chosen is one of the worst pieces of land that could have been selected for the purpose—poor, hungry, sandy land that will eat up manure as fast as it is applied. It is of the class of land that will yield fair crops so long as it is well manured, but without manure will yield poor returns. The principal business at the time of my visit was growing vegetables for sale in Barcaldine, and in this they were fairly successful. A small irrigation plant, worked by an engine lent by the Government, adds much to what success has up to the present attended them. A very short distance to the west of the settlement, which is situated on the edge of the sandy country, the soil is first class and well adapted to the growth of any crops. The immediate object of my visit to the district was to give my opinion as to whether it was adapted to wheat-growing; and after an inspection of the available lands and a number of large selections surrounding the township, I held a meeting and gave a report of my impressions, which was a favourable one, not only as regards wheat, but also favourable for the production of all kinds of crops that can be raised where wheat will grow. I was much interested in the artesian supply of water that seemed to be generally available wherever the strata was tapped, and took especial notice of its value for irrigation. The water of the Barcaldine well, at my visit, was so highly charged with mineral that it was detrimental to vegetable life; but I have since learned that a second supply has been obtained, which may be more suitable. Mr. Richardson, who has a selection about four miles from the town, has a flow of water from a well upon his property of about 1,000,000 gallons d. ly. This water I saw used for irrigating a vegetable garden with most satisfactory results, the garden to which the water was applied being only about thirty yards from the bore. At another place I saw the water from an artesian well being used to irrigate a 1,400-acre grass paddock, the vegetation alongside the bore being most luxuriant. At Longreach the land is, if anything, better than that around Barcaldine, and were there a favourable rainfall would be an important agricultural centre, which, in the course of time, there is no doubt it will be.

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HUGHENDEN.—After leaving Barcaldine I visited Hughenden, and found active agricultural operations being carried on there on several selections, though principally by Chinese. Here I had an interesting experience showing the superiority of the Chinaman over the average European in Northern Queensland in agriculture. One of the selections visited by me was owned by a dairyman, who had let a portion of his land to Chinamen, who sunk two wells upon their lease. The water from these wells was used for irrigating a vegetable garden, one being worked by an engine and pump, the other by a horse whim. The Chinaman was liberal in the application of water, of which there appeared to be a plentiful supply, and as a result had as good a crop of potatoes and other vegetables as one would wish to see anywhere. The owner of the land, on the other hand, who supplied the town with milk, had to turn his cows out for want of food, notwithstanding that his tenant alongside was showing him how to grow green stuff for his starving cattle. The most successful farmer in the district was Mr. Cox, who informed me that the year before last he sold upwards of £700 worth of hay and chaff; the crop last year was, however, a failure, owing to drought. There are two wells on the farm, on which are Californian pumps, worked by small whims. I tried to induce Mr. Cox to secure himself against future loss by proper irrigation, and although at the time he was afraid of the outlay, I have since learned to my pleasure that he has changed his mind and invested in a plant. While at Hughenden I inspected and recommended a site to be reserved for an agricultural college and experiment farm of an area of 2,371 acres. There is no surface water on the land, which is situated alongside the river, in which there is water at all seasons, and judging from the ease with which water was obtained on the adjoining land, I am of opinion that it formed an ancient bed of the river. A full report upon this matter was submitted to Mr. Cowley.

HERBERTON.—Some interesting experiments have been carried on here by Mr. Newell in connection with wheat-growing, the seed being supplied by the Department, and on visiting his farm I was gratified with the sight of as fine a field of wheat as could be seen anywhere on the Darling Downs. I have always maintained that Queensland is well suited to wheat-growing, an opinion that is further strengthened by the result of Mr. Newell's experiments. Wheat has now been proved, from St. George in the South, to Mitchell and Longreach and Herberton in the North, a sufficiently large area. At Herberton I inspected and recommended a site for an agricultural college and experiment farm, and hope that at no distant date both this and the site at Hughenden will be utilised for the purpose for which they are set apart.

TROPICAL AND SUBTROPICAL PRODUCTS.—At the close of 1892 Mr. Cowley, the overseer of the State Nursery, Kamerunga, was despatched to New Guinea, with the object of securing new varieties of sugar-cane and other products likely to be of value to Queensland. Mr. Cowley was very successful in his mission, excepting as regards the cane, a borer being found to be present upon arrival at Thursday Island. It being deemed advisable to prevent as far as possible the further introduction of this insect, it was decided to fumigate the cane with bisulphide of carbon. From want of knowledge, and my absence from the colony, the cane was destroyed. Notwithstanding this failure, the cost of the expedition was more than repaid by the addition of new varieties of bananas and other plants of economic value, which have been planted in the nurseries preparatory to general distribution, a list of which will be found with the report of the overseer. The information that I have received from the residents of New Guinea who are conversant with sugar cultivation has so convinced me that many new varieties of excellent cane are to be obtained, that I have despatched Mr. Cowley a second time to secure a further supply, from which I anticipate valuable results.

SERICULTURE.—Interest in this industry, judging by the applications for eggs and information on the subject, has in no way abated since my last report. To meet the increased demand for eggs, early in the year a fresh batch of Italian seed was procured and distributed, for which the Department is indebted to Dr. Enrico Quadjat, of Padova. Dr. Quadjat, bearing in mind the early hatching out of the last batch, took the precaution of retarding these, so as to permit of the hatching out occurring later on, which from reports to hand has been successful. To meet the inquiry for information on silk culture, a bulletin on the subject was issued, the preparation of which was entrusted to a member of my staff who has made a special study of this subject. The pamphlet has evidently met a long-felt want, as evidenced by the number of applicants for the publication. It being brought to my attention that possibly the wild silkworms of India would do well in this colony, communication was opened with the authorities of the Indian Museum, resulting in the shipment from that country of a quantity of Tusser (*Antherea mylitta*), and Eri (*Attacus Ricini*) cocoons. The former arrived in good condition, and several moths have now cut out, and a small supply of eggs secured. Unfortunately, however, the Eri cocoons had cut out on the voyage over, and died. A further attempt will be made to secure a supply during the course of the year. The Eri being a multivoltine worm, and its chief food, the castor-oil plant, being prolific in this colony, is a strong inducement for its introduction. Thanks are due to Mr. E. C. Cates, of the Indian Museum, for the trouble and care taken in procuring and forwarding these cocoons. It seems not improbable that sericulture, or one of its branches, cocoon-raising, will, in the near future, be found sufficiently profitable to induce many who at present are looking around for some light yet remunerative occupation, to take it up.

RICE.—The cultivation of this cereal is making rapid progress in the colony, the dry season in the North having been favourable to harvesting operations, the returns from the 500 acres under crop averaging about two tons of paddy to the acre. There are probably more varieties of rice than of any other cereal, and to secure the best the Department is yearly importing new kinds from India, China, and Japan. Last year eleven varieties were secured from India, and Sir T. Mellwraith has advised me of thirteen new kinds obtained by him during his recent visit to India, and which are daily looked for. The success of the last crop will no doubt tend to larger operations this year.

AGAVA SISALANA.—In my last report I drew attention to this valuable plant for the production of fibre, and to the unsuccessful attempt that had been made to introduce suckers from the Bahamas, owing to the export of plants having been prohibited. A fresh attempt and one more successful was made, and 1,000 plants were obtained from Yucatan. These have been partially distributed, but the greater proportion have been placed in the nursery at Frazer's Island, the soil of which is admirably adapted to the plant, and so soon as available will be generally distributed.

COCOANUTS.—The planting of cocoanuts (and other plants of value) upon the islands has been continuously carried on during the past year, and constant care and watchfulness has been bestowed upon the young plantations. The cutter "Lizzie Jardine" has, by the kindness of the portmaster, been employed upon the work during the whole year. I am necessarily dependent to a great extent upon the officer employed for information as to the progress made. To enable me to judge whether the work done justifies the expense, and to form an opinion as to whether it should be further prosecuted, I propose visiting the islands already planted. The following is the report of the officer in charge of the "Lizzie Jardine":—

"Cutter 'Lizzie Jardine,'
"Mackay, 4th May, 1893.

"SIR,—Herewith I have the honour to submit my first Annual Report:—

"On receiving my appointment as superintendent of cocoanut planting, I left Brisbane on the 23rd July, 1892, and arrived at Mackay on the 25th. Mr. Armitage met me on arrival, and handed over the charge of the cutter 'Lizzie Jardine' and stores to me the following day. The crew being discharged, I engaged them again, with the exception of one man, who was not recommended. On 4th August I sailed to the island plantations on a voyage of inspection, and found the cocoanuts generally in good condition, but some failures in growth, which I have since replaced with growing nuts. Fruit and other trees were not doing well, apparently suffering from drought. During the month which it took to make the trip I planted 350 cocoanuts on Brampton (M. Island), and 350 in a nursery at Port Newry. I found that there was yet a good deal of soil suitable to plant cocoanuts in on these islands. The nuts, some of which are now 6 feet high, will become of great value in a few years if well attended to, and I have no doubt they will greatly assist in settling the district. The coasters are already getting to know our plantations. On returning to Mackay I made some necessary changes in the crew, sailed again, and commenced planting, and have carried it on continuously ever since. I enclose herewith a list of the cocoanuts planted by me. I have also planted a large quantity of trees, vegetables, and fruit seeds; but, although they have nearly all grown, the most of them have been destroyed by what appears to be a worm of some sort, so that there are now only sweet potatoes, yams, and watermelons growing. Nearly all the nuts planted by my party are growing well, although they have been such a short time in the ground. The weeds grow very fast, and involve a lot of work.

"*Castor Oil and Pine Trees.*—The castor oil planted by me at Port Newry did well, and produced good seed; but as the industry does not appear to progress in the colony at present, I discontinued planting, and stopped the extension of the growth of those already planted. Pine-tree (or fir) shoots, of which there are a good many on some islands, I have transplanted to others where there are none. These trees are likely to be of great commercial value, and are also used ornamentally.

"*Depôt.*—I think that a depôt at Port Newry, with a residence for superintendent, would be of great service, and would greatly reduce the cost of the work, by producing stock, vegetables, &c., for the men employed. I mention Port Newry as it is central for the plantations and near them all; it is also likely to become of note, on account of having a good harbour.

"*Cutter.*—Am pleased to say that the cutter is being kept in good working order; the copper is very thin and much worn, so requires frequent patching; the mainsail also often requires repairing; some of the ironwork, too, is a good deal worn, and also requires renewing occasionally. The punt which I had built has been of great service to us in doing the heavy work, and is in good order; the dingy has been well kept and strengthened, and is now a better boat than ever.

"In

"In conclusion, I have to inform you that I have received valuable assistance from Mr. Finlayson, of Seaforth, who takes a great interest in the work, and is always eager to assist in any way. Mr. E. Cowley, Overseer of the Kamerunga Nursery, also supplied me with useful information, and Mr. McCarthy, the Sub-collector of Customs, is always ready to help with anything required.

"I remain, &c.,

"J. GRIFFITHS.

"The Under Secretary for Agriculture, Brisbane."

COCOANUTS PLANTED.

Brampton, M. Island, 363; Newry Island (in nursery), 375; Shaw Island, Kennedy Sound*, 264; Neek Bay, Kennedy Sound,* 310; Rabbit Island, Port Newry (in nursery),* 400; Repulse Island,† 240; L. Island, Keswick, 50; Rabbit Island, 405; Rabbit Island (in nursery), 347; Total planted, 2,754. Now on board cutter, 750. Number planted to 30th May, 1892, 6,747. Total to date, 10,251.

THEOBROMA CACAO.—Believing that this valuable plant can be successfully cultivated in the North, a wardian case of seeds was obtained from Ceylon. Unfortunately many of the seeds germinated upon the voyage, and many young plants perished; however, a few were saved, and these are doing well at Kamerunga. Experience has been gained in this shipment, which will be of service when a further supply which it is proposed to obtain is asked for.

ANNATTO.—The preparation of this article of commerce has been successfully effected by Mr. James Diek, of Cooktown, which has been tested by the dairies, and found to be equal to that imported. The manufacture of this, like the establishment of butter and cheese factories, may be credited to the efforts of this Department, and to the teachings of the Travelling Dairy.

COW-PEA.—The introduction of this plant has been fully justified by the favour which has been bestowed upon it by the sugar-planters, and others who need something to restore their exhausted land. Large quantities have been distributed from the nurseries, and it has come to my knowledge that importations in bulk have been made by private individuals and companies on their own account.

STATE NURSERIES.—These continue to do good work, and have been of great service in the cultivation and distribution of economic plants of value, they being, with the exception of the Forest Nursery at Frazer's Island, the only places under the direct control of the Department where experiments can be carried out. The advantage of these institutions is shown by the fact that during the last cane-planting season many tons of cuttings of new varieties of cane were distributed to planters in the district. The seedling canes received from the Royal Gardens at Kew have been so far successful that the overseer was in a position to distribute a number of plants. It is early yet to give an opinion upon the value of this cane, but it is within reason to anticipate good results. To carry out the cane experiments more systematically, the overseer at Mackay has been instructed to specially prepare three acres of land, to be divided into quarter-acre blocks, to carry out different methods of cultivation, with a view to secure the highest results. At Kamerunga, considerable attention is being paid to the cultivation of coffee, which is likely to be largely followed in the North, and a fair amount of success has attended the operations up to the present. The cultivation of fibre plants is a main feature of this nursery, and some excellent specimens of fibre have been manufactured by the overseer, which are on view in the museum of this office. This nursery now contains probably the largest collection of different varieties of bananas in the colony. Plants have been obtained from Fiji, New Guinea, and other places. These are now being cultivated, and will be shortly ready for distribution. To further extend the practical use of these nurseries, a vote was last year obtained for the necessary expenditure to enable youths to be employed and taught the practical part of horticulture, and in a small degree, agriculture. It has been decided to make the experiment at Kamerunga, and although the beginning has been delayed, steps have now been taken for the erection of quarters to receive the boys, who will be taught by the overseer, and receive a small wage for their work. The reports of the overseer are attached.

CENTRAL SUGAR MILLS.—The success that has attended the operations of the Central sugar mills during the past year has been satisfactory. The mills having been erected before a full supply of cane was available practically caused them to be inoperative during the first three years of their existence so far as the repayment of their indebtedness to the Government is concerned. Since that time their progress has been in an upward direction, the Racecourse Central Sugar Company having now paid up all arrears of interest to the 31st December, 1892. The North Eton Central Sugar Company, which owes the Government considerably more than the Racecourse, has not yet succeeded in wiping off its arrears, which may be set down to the larger annual payment that has to be made. The progress, however, after making allowances, is on a par with the Racecourse, the operations for last year enabling the directors to repay to the Government the sum of £3,853 5s. The arrears of this company on the 31st December last stood at £3,178 2s.

SMALL FARMS ON SUGAR PLANTATIONS.—To ascertain as far as possible how far the movement for the cultivation of cane by small farmers is progressing, or, in other words, how far the Central mill question is taking root in Queensland, inquiry was made last July at Mackay, Bundaberg, the Johnstone and Herbert Rivers, with the results herewith shown, from which it is evident that the movement is increasing:—

Mackay, 143 farmers, of whom 22 are shareholders in the Central mills, are growing cane upon 4,351 acres.

Bundaberg, 148 farmers, upon 4,264 acres.

Herbert River, 68 farmers, upon 3,293 acres.

Johnstone River, *nil*.

Care

* Nuts received from Mr. Barnes, of Mackay.

† Nuts received from Mr. Finlayson, Seaforth.

Care has been taken in obtaining the above information to exclude all those who would come under what are generally known as "planters"; in other words, all the above farmers, excluding the shareholders in the Central sugar mills at Mackay, grow cane for sale at a mill in which they have no direct interest otherwise than as a market. The Department has obtained from sugar-planters amended particulars of the conditions under which they are prepared to lease and sell land to farmers who will grow cane for sale at market rates to their mills. These have been put into leaflet form, and are at the service of the public.

PINEAPPLE DISEASE.

NOTE BY MINISTER.—Consider conclusions arrived at by Mr. Tryon most unsatisfactory.—A.S.C.—16-3-93.

In referring in my last report to the disease attacking the pineapples at Nundah, I stated that an effort had been made to secure the services of Dr. Cobb, the eminent Vegetable Pathologist of the Department of Agriculture in New South Wales, to thoroughly investigate the matter. Being unable to obtain the help of Dr. Cobb, Mr. Henry Tryon, the Assistant Curator of the Museum, was, at the request of this Department, instructed by the trustees of the Museum to make an investigation. Mr. Tryon spent twelve days in the Nundah district, and submitted the following report:—

"Queensland Museum, Brisbane, 7th March, 1893.

"SIR,—Herewith I forward, for the information of the Minister, Mr. H. Tryon's report on pineapple disease at Nundah.

"I have, &c.,

"C. W. DE VIS, Curator.

"The Under Secretary for Agriculture.

"PINEAPPLE GARDENS INSPECTED.

"For the purposes of this inquiry, the following pineapple gardens were inspected, some being visited more than once:—

"*Nundah District*.—Those occupied by H. Bilsen, J. Bowden, — Connah, J. Corbett, — Frenk D. Finger, D. Franz, J. Melton, — Merke, — Rodé, H. Pfinsk, and G. Wiscombe.

"*Eagle Junction*.—Those occupied by I. Stuckey and J. Stuckey.

"*Geebong*.—Those occupied by F. Jordan, A. J. Manatan, W. Muckle, C. Chapland, and T. Smith.

"*Zillmere*.—Those occupied by — Albury, — Bridges, H. Bruce, the Christian Brothers, C. M. Fischer, M. Flemming, Hartley Brothers, J. Kummer, J. W. Lee, H. and A. Robinson, A. Ruthenberg, T. Smith, J. Smith, and R. Sumner.

"*Nudgee*.—Those occupied by A. Attow, W. Bennett, H. E. Burgess, — Fischer, — Flemming, — Rodé, and W. B. Robinson.

"In addition, in each of these districts other gardens, which did not appear to offer any conditions different from those presented by gardens adjoining them and which were inspected, were carefully overlooked.

"GENERAL CHARACTERS PRESENTED BY DISEASED PINEAPPLE PLANTS.

"I. *The Plantation*.—If the plants are affected to any extent, it will be observed that their ordinary somewhat darkish green hue has been replaced by one in which red and yellow colours predominate, or, owing to the wilting and twisting of the leaves from their points downwards, a brownish tint pervades the plantations, and this is also symptomatic of the presence of the 'disease.' If this has already continued for some time, it will be further noticed that the rows in which the pines have been planted have their evenness disturbed owing to the occurrence of stunted and discoloured plants, even if they are not interrupted, as is often the case, by gaps which either lack the presence of plants or are already occupied by ones of younger growth with which the diseased ones have been replaced. Again, a row of pineapple plants, in other respects presenting the appearances accompanying the healthy condition, will by the presence of one or more pale-green areas still manifest a partial injury here and there.

"*Note*.—These appearances, however, must not be confounded with those due to defective cultivation, poverty of soil, or frost—agencies which, whilst somewhat similar as regards effects, are especially recognisable owing to their more general occurrence.

"GENERAL CHARACTERS PRESENTED BY DISEASED PINEAPPLES.

"II. *The Plant*.—On closer examination, and on attention being bestowed on individual plants, it will be found that the leaves of such as are affected having lost, to a certain extent, their usual turgidity, lack the full rigidity so characteristic of the foliage of the healthy pineapple; and if they bear fruit at all, this has already assumed a yellowish hue long prior to the time when, under ordinary circumstances, it should do so, as judged by its dimensions; in fact, it is stunted and etiolated. As usually happens, however, there are far more pronounced symptoms of decadence, for the plants have commenced to die back and decay. The apical leaves and shoots have either already fallen away, or may readily be removed *en masse* by the hand, for, as may be observed, they are already rotten at their bases of attachment. At other times, again, in an affected plant a 'sucker' on secondary branch merely becomes pinched off, so to speak, from its parent stem, the tissue at its base having first rotted, and then become shrunken and discoloured. On carefully lifting from the ground a plant presenting any of the above symptoms, some explanation of their occurrence will be found in the fact that the roots proper are already dead and in an advanced stage of decay, and that no new ones are being produced. And, in fact, the vegetative process has been long arrested, as may be seen on making a longitudinal section through the centre of the stem, whereby will be revealed a patch of decay which, having evidently started at the extreme apex, is encroaching downwards on the tissues, and more or less nearly meets a second patch approaching it from the base.

"IMMEDIATE CAUSE OF THE DISEASE.

"*Note*.—This disease is both insidious in its nature and tardy in its operation, and the decadence of the pineapple, a plant of great staying powers, when affected by it, is, therefore, very slow, being oftentimes months in progress. Meanwhile it is living at the expense of the abundant food material which, previously elaborated, is stored in the solid stem. Especially is this the case during the winter months, when the plant is undergoing its seasonal rest. Thus it happens, even when the outward evidences

evidences of the disease are very marked, its originating cause may be so remote in time in its operation as to defy observation; and, moreover, owing to the advanced stage of decay attained before the presence of the disease is plainly manifested, any inference as to its true nature may assume the character of a mere conjecture. In fact, the death of the plant and the external symptoms which herald it are immediately due to its connection with the soil, being severed through loss of its roots. The discovery of the true cause, therefore, thus resolves itself into one of finding that through the operation of which this loss of the roots is brought about. To accomplish this it is therefore necessary to examine a long series of plants, one term of which shall include those such as are described as exhibiting the general characters recognised as those of disease, and the other such as are outwardly healthy, but have their roots, though intact, commencing to decay, whilst the intermediate members of the series represent gradually augmenting stages of the disease. The difficulty of the investigation centres on that of finding such a series, and being at the same time persuaded that they illustrate stages in the progress of the disease.

“First Stage.—Roots normal in appearance, but the root-hairs, instead of being simple cylinders, ending obtusely, terminally twisted, and widening; being, in fact, irregularly clubbed. The expanded position containing granular matter, apparently inorganised.

“Note.—The connection of this condition in the plant with those hereafter described is rather inferred than proved. But any abnormal condition of the organs through which in the first instance the essential food material is assimilated, must act prejudicially to the plant exhibiting it. But though this abnormal condition of the root-hairs has been discovered in plants undoubtedly diseased, it must be admitted that it has been also observed in plants derived from a plantation to all appearances perfectly unaffected.

“Second.—The young unligified roots are discoloured at their extremities, and tend to collapse when subject to pressure.

“Third.—The roots are pale-brown towards their extremities, though otherwise normal in appearance, and collapse readily on pressure, instead of being white and resilient.

“Fourth.—All the young roots are affected as in the third stage, and this condition has extended upwards along their course, until those with woody central bundles are similarly implicated.

“Fifth.—The roots have all died, and decay has supervened.

On submitting the roots described as illustrating the second and subsequent stages to microscopical examination, it is found that a special fungus in different stages of growth occupies the tissue intervening between the central bundle and the external wall, and that its growth is attended by a complete breaking down of the tissue which supports it. This fungus accompanies the discolouration of the roots alluded to, and without doubt affects it, and, in fact, must be regarded as causing the disease.

“The Fungus.—This fungus, which is itself colourless, consists essentially of an intricate network of mycelium supporting conidia, composed of two rounded elements having a double contour. The conidia may be almost sessile upon the mycelium, or may be supported on slender pedicels of greater or less length. They are readily detached, and, in fact, are generally found existing with the mycelium in the tissue, either with two elements (spores) combined or isolate. In fact, in this condition they may occur even within the vessels traversing the root tissue.

“NATURE OF SOIL INFLUENCING PRESENCE OF THE DISEASE.

“Where no other conditions obtained which would tend to impair the healthy vitality of almost any plant, but especially the pineapple plant, it was observed that certain classes of soil specially favoured the presence of the disease—viz., those in which water remained near the surface, either owing to its inability to percolate to lower levels by reason of the presence of an impervious subsoil, or too ready connection of the soil with lower water-bearing strata, by reason of some special property facilitating capillarity, such as occurs in light soil gradating into a subsoil almost wholly arenaceous. Thus there were found two different classes of soil in which one might expect to find plants subjected to the disease, a circumstance which has given rise to the opinion that the character of the soil in no way influences its presence. Abundant evidence, however, confirms the above observation.

“Cultivations in which the disease was general exhibited (1) a shallow soil of light colour consisting of a loam, with a high percentage of clay resting upon a clay subsoil; (2) a light sandy loam gradating downwards into a clay subsoil; and (3) a very sandy loam with subsoil composed of almost pure sand.

“It happened, however, that a single description of soil rarely obtained throughout an entire farm, so extensive and variable have been the movements in past geological ages of the subjacent beds whence it has been derived, and which have had the effect of rendering superficial many different kinds of soils and subsoils. As a result a plantation might exhibit wholly or in part a gravelly subsoil or an unusual depth of surface soil, and these both operated favourably for the growth of the plant. In some instances these special variations predominated, and then the affected plants were confined to isolated or to larger but fairly well circumscribed areas.

“Instructive evidence in support of this attributed influence of the soil was afforded by two neighbouring selections, now occupied by Mr. H. Bilsen and Mr. J. Bowden respectively on the Nundah-Zillmere Road. In the case of each of these we have the soil largely composed of clay; but a deep deposit of gravel or fine conglomerate, similar to that exposed in the quarry close at hand, underlies continuously a portion of both; and the pineapple plants growing over it are the very picture of health. But as we proceed beyond the limits of the gravelly subsoil and reach to where it is replaced by clay, the plants look unhealthy and are diseased in patches, especially where the soil is shallow. Again, at Nudgee, where the red soil is deeply underlain by an open subsoil composed of grit or gravel, the pines are healthy almost without exception. Amongst these exceptions we may take the significant instance afforded by the plantation of Mr. A. Attow. The greater part of this, where the ordinary soil of the neighbourhood prevails, is in perfect condition as regards the pineapple plants; but on a portion of this selection extending towards the south, where the porous subsoil is replaced by one of clay, and on an adjoining selection still further beyond, where the subsoil also is of the latter description, the plants are rapidly failing. The influence, however, exerted by an impervious subsoil is minimised in cases where the overlying soil is of some depth.

“For

“ For illustration of the ill effects due to the presence of a sandy subsoil we may take the plantations in a line passing from the selection occupied by Messrs. H. and A. Robinson through those of J. Smith, C. M. Fischer, F. Jordan, A. J. Manatan, C. Chapland, T. Smith (Geebong Road property). These, however, will no doubt be greatly improved by a system of subsoil drainage properly carried out.

“ There is, however, every reason to believe that many of these light soils, except such as are absolutely poor or from their low-lying position are always wet, which during a continuance of wet seasons such as have of late years been experienced, favour the disease, will by their staying qualities prove tho superior ones when the opposite conditions obtain, and several dry years follow one another. This is agreeable to the experience that some of the cultivations hitherto reputed to be amongst the best ones have suffered most.

“ CONCLUSIONS.

- “ 1. That the disease is immediately caused by a special fungus, which is parasitic within the root tissue.
- “ 2. That the injurious operation of the fungus is dependent on the prevalence of certain meteorological conditions, and on the pineapple plants being grown on soils having special definable characteristics.
- “ 3. That, therefore, it is not necessarily either contagious or, indeed, communicable.
- “ 4. That the disease is in no way influenced by—(1) The character of the plants themselves ; (2) By the fact of the plantations having been long under a crop of one kind ; (3) The nature of the manure employed ; or (4) By the method of cultivation.
- “ 5. That beneficial results will accrue if drainage be adopted in the case of one of the soils indicated as being otherwise unsuitable for pineapple growth, and if, in the case of the other, pineapple cultivation be abandoned.”

This report being considered unsatisfactory by the Minister, some of the conclusions arrived at being directly at variance with the experience of the fruit-growers of the district, and it being necessary, in view of the great importance of the question, to leave no stone unturned to discover if possible some remedy, it was decided to turn to another direction ; and an analytical investigation was determined upon, that a comparison might be made between the soils upon which healthy and diseased were growing, and also between the plants growing upon these soils. The analyses were nearly completed at the death of Mr. Clarke, the late Government Analyst, and have been finished by Mr. Wain, his assistant, and are as follows :—

“ Government Chemical Laboratory,
“ Brisbane, 1st June, 1893.

“ Sir,—Following I have the honour to submit analyses of three samples of soils :—

	SOILS.		
	Advanced Stage of Disease.	Less Advanced Stage of Disease.	Healthy Plants.
	No. 1.	No. 2.	No. 3.
Moisture... ..	1·15	1·25	1·10
Volatile matter... ..	6·50	5·65	4·50
Oxide of iron and alumina	16·50	6·10	14·60
Lime	·50	·26	·30
Magnesia	2·50	·39	·39
Potash (K ₂ O)	·10	·13	·09
Soda (Na ₂ O)	·27	·50	·44
Phosphoric acid (P ₂ O ₅)	·66	2·36	·37
Carbonic acid	·25	·30	·30
Chlorine... ..	·05	·04	·04
Sulphuric acid (So ₃)	2·99	2·99	2·61
Silica	68·53	80·15	75·22
Loss	·00	·88	0·04
Nitrogen... ..	100·00 ·09	100·00 ·05	100·00 ·06

Soil No. 1.—In which pineapples in an advanced stage of disease are growing.
Soil No. 2.—In which pineapples in a less advanced stage of disease are growing.
Soil No. 3.—In which healthy pineapples are growing.

“ I have, &c.,
“ WM. C. WAIN.

“ The Under Secretary for Agriculture, Brisbane.

“ Government Chemical Laboratory,
“ Brisbane, 13th June, 1893.

“ Sir,—Following are results of my analyses of two pineapples from Nundah. No. 1, diseased ; No. 2, good :—

	No. 1.	No. 2.
“ Water	90·03	83·05
Albumenoids	·35	·78
Woody fibre	·22	·39
Fat	·23	·30
Sugar	·95	1·22
Nitrogen free extract... ..	7·79	13·83
Ash	·43	·43
	100·00	100·00

Composition

“Composition of ash—

Iron and alumina	...	...	...	...	·047	...	·070
Lime (CaO)	...	...	...	...	·042	...	·019
Phosphoric acid (P ₂ O ₅)	...	...	...	...	·038	...	·035
Sulphuric acid (SO ₃)	...	...	...	...	·013	...	·025
Carbonic acid (CO ₂)	...	...	...	...	·040	...	·040
Chlorine (Cl)	...	...	...	...	·034	...	·049
Magnesia (MgO)	...	...	...	...	·034	...	·041
Soda (Na ₂ O)	...	...	...	...	·066	...	·084
Potash (K ₂ O)	...	...	...	...	·097	...	·063
Silica (SiO ₂)	...	...	...	...	·025	...	·005
					·436	...	·431

“I have, &c.,

“WM. C. WAIN.

“To the Under Secretary, Agricultural Department, Brisbane.”

A chemical analysis was determined upon, because it was thought possible that the soil in which the diseased plants were growing had become so far exhausted of the constituent elements (by overcropping or otherwise) necessary to plant life and fruit-building properties, that their absence, as shown by the analysis, would indicate what was wrong, and, perhaps, could be replaced. These analyses, however, do not bear out what was expected of them. There are no strongly-marked differences in the characteristics of the soils that supply any reason why the disease might not be as bad on one soil as on another.

The cause cannot be assigned to want of drainage, because some of the farms which have suffered most have been thoroughly well drained, and yet no relief is felt, the disease still remains. To my mind the only course that is likely to bring relief is to follow the advice given by Professor Shelton, when the disease was first brought under the notice of the Department, and that was to plough out all those plots on which the disease had made its appearance, and plant other crops thereon for a year or two.

RAISIN AND CURRANT GRAPES.—As referred to in my last report, 40,000 cuttings of these grapes were last year imported, 20,000 having been obtained from Victoria and 20,000 from South Australia. These cuttings, which were of many varieties, were carefully fumigated before they were allowed to leave this office. From reports that have come to hand it can be safely said that fully 75 per cent. have struck and are doing well, a result which is very satisfactory, considering the handling they underwent from the time of cutting until they reached their destination. They were packed in South Australia and Victoria, shipped, unpacked, fumigated, and repacked here, with the addition of being knocked about on ships and railways.

WHEAT.—This subject is dealt with by Professor Shelton, who has carried out the experiments in connection therewith, and attended the Conference on Nomenclature held in Sydney. The last crop averaged about 15 bushels, a lower average than the previous year, the cause of which can be attributed to climatic conditions, there having been little or no rust. Experiments are being carried out at test stations by the Instructor in Agriculture, to endeavour to select the best rust-resisting varieties, and in fulfilment of the recommendations of the Rust Conference. Much attention has been given by the Department to the cultivation of wheat, and it is not encouraging to go on with the work and to expend money and time in the endeavour to obtain varieties suitable to our soil and climate, to be told, when a suitable variety has been procured, by millers possessing antiquated machinery, that because these wheats are hard wheats they cannot purchase them. The Department is then blamed by the farmers for inducing them to grow what they cannot sell. This is notably the case with a wheat introduced four years ago, called Belatourka, and which has been successfully cultivated on the Downs and elsewhere. That this wheat has been unjustly condemned by some millers is patent from the report made by the Brisbane Milling Company; from the report of the baker at Dunwich, who baked the flour into bread; from the statement of the Queensland Milling Company, as detailed in my Annual Report for 1890-1, all of whom are unanimously in favour of it. This wheat, which has the reputation of hitherto being free from rust, contains a larger percentage of flour than any other variety.

KAFFIR CORN.—Although I have previously written of this plant, I feel constrained to again call attention to its excellence as a fodder and food plant. As a fodder, it is equal to any other of the same family; as a food plant for horses and fowls, its value is now being realised by some farmers; and as food for human beings, analysis has shown it to be equal to wheat. I have eaten it as bread, and have used the meal regularly in the form of porridge, in which form, to my mind, it excels oatmeal. As for yield there is no crop to equal it, three crops being obtained from one sowing. From the report made by me in a former annual report, the Government of India formed such a favourable opinion of this plant, that they applied to be supplied with a quantity of seed. The thanks of the community are due to Mr. Henderson, of Kingholm, for the introduction into Queensland of Kaffir corn.

TRAVELLING DAIRIES.—The applications for the dairy during the past year not having been sufficient to keep two plants going, No. 1 Dairy was laid up and the staff discharged, the manager, Mr. McCormick, obtaining, upon my recommendation, the post of manager of the Government Dairy in Tasmania, which has been lately established upon the same lines as our own, in preference to the systems in force in New South Wales, Victoria, or South Australia, a fact which is gratifying to this Department, the more so when it is remembered that the Tasmanian Council of Agriculture, when starting their dairy, made all inquiries into the different systems, with the express purpose of deciding which was the best. Mr. McCormick received all his instruction when serving with the Queensland Dairy, and learnt his lesson so carefully that since taking over the Tasmanian Dairy he has received the warm approbation of the Council of Agriculture. Mr. Watson, the assistant, has since been posted to the dairy under charge of Mr.

Mr. Mahon ; Mr. Hitchcock, whose place he fills, having accepted the position of manager of the Samsonvale Butter Factory. To illustrate the favour with which the dairy is received by the farmers, it may be mentioned that when the plant entered the Fassifern district only one application for its services had been received ; before it left, operations had been carried out at eight different places, and instructions given to a large number of pupils. In a climate which is so warm that, in summer, milk will not keep sweet for many hours, any remedy that will prevent milk turning sour will be of great value. A discovery has been made in France for sterilizing milk, generally known under the name of pasteurizing, which will keep milk sweet and wholesome for long periods. All methods of sterilization known hitherto have had the disadvantage of giving a taste to the milk similar to boiled milk, and of rendering it less easily absorbed by the body. Pasteurization does not destroy all the bacteria in milk, but it greatly increases the keeping qualities, and almost entirely destroys the danger of disease from germs in the milk. This is accomplished by a process of heating up to 155 degrees Fahrenheit for a few minutes, and then cooling rapidly. Steps have been taken to obtain, through the Agent-General, full particulars of the system, which will probably be of immense service in Queensland. The following statistics furnished by the Registrar-General practically prove the benefits that have been derived from the instruction of the Travelling Dairies since their initiation :—

				QUANTITIES.				VALUES.			
				1889.	1890.	1891.	1892.	1889.	1890.	1891.	1892.
				lb.	lb.	lb.	lb.	£	£	£	£
Butter	...	...	...	781,442	366,317	313,419	131,895	35,041	13,436	14,182	7,338
Cheese	...	...	...	1,274,310	1,106,762	971,869	709,309	31,853	23,192	20,174	15,727

The report of the manager of the Dairy, with full particulars of the operations that have been carried out during the past year, are appended.

RESERVES.—The effect of the different system under which Parliament has been pleased to grant subsidy to public parks and gardens has been to cause the trustees in several cases to resign their trust, and throw the responsibility of keeping the gardens in order upon the municipal councils. The difficulty in collecting subscriptions upon which to claim endowment has generally been the stumbling-block.

CONFERENCES.—These meetings, so valuable to the farmers, have now become a definite part of the work of the Department. During the past year three have been held—at Beenleigh, Rockhampton, and Mackay—and judging from the interest shown, and the inquiries for the bulletins containing reports of the proceedings, they are productive of good in educating the farmers to more advanced methods of cultivation.

COTTON.—The practical establishment of the manufacture of cotton goods at Ipswich has placed the cultivation of the plant in the West Moreton district upon a very different basis to that occupied by it in former year. To use an Americanism, “It has come to stay;” and to render all assistance in finding outlets for the surplus cotton, the Department has communicated with Japan to find out what chance there is of a market in that part of the world.

IRRIGATION AND DRAINAGE.—The present unsettled state of affairs has involved a tendency for bodies of people to settle upon areas of land, and inquiries have more than once been made at this office for sites for irrigation colonies. Few of those, however, who talk of irrigation have any ideas of the general principles upon which it must be carried out. In some places where water is available, it could not be profitably applied without a proper system of drainage, and indeed would be more detrimental than beneficial. Again, many areas of land that have been under cultivation for years would be greatly benefited by drainage. The thoughts arising from these inquiries and from my knowledge of the country, leads me to suggest that a Drainage Act, under which farmers could obtain a loan from the Government, secured upon their property, would be of great service. In the early days, when the greater part of the farming lands were held by the State, or by private individuals under lease, such a system would not have been workable; but the case is now altered, freeholds having been obtained, valuable improvements placed thereon, and farms held to make a living from them, and not as a speculation. I would not make a loan obtainable upon other than freehold property.

FERTILISERS.—For a long time it has been a matter for regret to those interested in Queensland agriculture to know that the refuse from several of our boiling-down and meat preserving works has been exported from the colony instead of being utilised upon some of our exhausted sugar and other lands. This has now come to an end; and not only have mills been erected for crushing the bones, but other means have been adopted for converting what has hitherto been a waste product into an excellent manure; and moreover, quantities of artificial fertilisers have been imported to meet a growing demand for manurial agents. It is well known that many of these preparations are not what they purport to be, and the sale of them should be prohibited by legislation. I am not aware that any of these spurious imitations have yet reached Queensland; but as the demand for fertilisers increases, the temptation will be strong, and it is possible our markets will be swamped with these mixtures, to the detriment of our farmers.

SAMPLES OF COLONIAL PRODUCE.—To enable the Emigration Lecturer in Great Britain to give practical illustration of the products of Queensland, samples of the different principal products were sent home at the close of last year, and will be renewed from time to time as occasion requires. From Mr. Randall's report for December last, considerable interest seems to have been manifested by the agricultural communities which he visited; and some of the samples, notably the wheat, were much admired.

ARBOR DAY.—The distribution of trees for this year was not nearly so large as in former years, which can be set down partly to the season, and partly to the fact that many schools have now planted their grounds. The distributions up to the present are:—1890, 7,650; 1891, 3,648; 1892, 3,169; 1893, 1,697. These figures do not include trees distributed by the Acclimatization Society, or those procured from private sources. Particulars of the distribution will be found in Appendices.

FRUIT

FRUIT TO CANADA.—Taking advantage of the new means of communication with Canada, ten cases of oranges and two cases of pineapples were forwarded from this Department to the Minister of Agriculture at Vancouver Island, with the request that, should the fruit arrive in good condition, one-half were to be sent on to Quebec, to further test the length of time the fruit would keep. With this consignment were also sent two cases of oranges on behalf of Mr. O'Donovan, and ten cases of arrowroot for Mr. S. Grimes, M.L.A. This shipment being purely an experimental one to test the different modes of packing, I felt the necessity of consigning it to a source whence a reliable report upon the condition of the fruit on arrival could be obtained, that the information gained might serve as a guide and be available to the public. Great hopes are entertained of the market to be opened up with Canada, but it has yet to be proved whether the demand on the west coast will be sufficient to support a large export trade, and the more we travel east the more shall we be brought into direct competition with Florida, California, and the West Indies, with extra freight to handicap the trade. The following are the particulars of the different methods in which the fruit was packed :—

Two cases of oranges pulled and packed in fruit paper.
 Two " " cut and packed in fruit paper.
 Two " " packed in Eureka fruit packing.
 Two " " packed in Eureka fruit packing, with bisulphide carbon added.
 Two cases of pineapples.

AGRICULTURAL COLLEGE.—To my great regret, circumstances have not permitted the expenditure of the vote twice passed by Parliament for an agricultural college and experiment farm, a circumstance which is the more unfortunate because at the present time of depression the minds of many are being directed to land settlement, the opening for the youths of our towns and cities in trades and commercial life becoming each year more limited, and the parents are crying out for the form of education which an agricultural college would provide. Not a few of the young men of this colony have of late, to my knowledge, been sent to Victoria, New South Wales, and America, to receive that education in agriculture which they ought to be able to obtain here.

INSTRUCTOR IN MEAT PRESERVING.—Mr. C. T. Allcutt, who has been appointed as Instructor in Meat Preserving, reached Brisbane from America at the end of 1892, since which time he has been continuously engaged in rendering assistance and giving advice to those companies already established and to those in course of formation, during which time Mr. Allcutt has travelled about 5,000 miles in the execution of his work. The following are the companies to whom Mr. Allcutt has given assistance :—Barcardine Boiling Down and Meat Preserving Company, Limited ; Hogarth Australian Meat Preserving Company, Oakey Creek ; Queensland Meat Export and Agency Company, Limited, at Brisbane and Townsville ; Central Queensland Meat Export Company, Lake's Creek ; Dalgona Meat Works, Normanton ; Carpentaria Meat Export Company, Limited, Burketown ; Graziers' Butchering Company, Brisbane ; North Queensland Meat Export Company, Limited, Alligator Creek ; Torrens Creek Meat Company ; and Hollandia Meat Company, Brisbane. Meetings for the formation of companies, at which Mr. Allcutt was present, have been held in Townsville, Bowen, and St. Lawrence.

INSECT PESTS.—The want of an entomologist in this Department is felt in a greater degree year by year. Many farmers send down insects for determination, and ask for information concerning the pests that are destroying their crops. Having no officer competent to undertake this work, I am compelled to either fall back upon the officials of the museum, and so interfere with the course of their duties, or to inform the applicants that I am not in a position to afford them the information they ask—a position which I feel greatly, as it is clearly the duty of a Department of Agriculture to be able to deal with such matters.

SEEDS DISTRIBUTED.—The following is a short summary of the reports received of the seeds distributed during the past year, to which is added a schedule showing the number of individual parcels sent out, and the names of the firms from whom seeds were purchased :—

Teosinte.—Gives fine crops.

Tobacco.—In reports so far the crop was usually destroyed by floods, grubs, or blight. It did well, however, in a few cases where it had a fair chance, but the market was not a good one.

Tomato "Trophy."—Gives large crops of handsome fruit.

Willows in one case are doing well.

Mangosteens.—A proportion have germinated at Bowen Park.

White Maize.—Does very well in most parts of the colony, though the colour is disliked by some.

Brazilian Stooling Flour Corn.—Very suitable, though rather subject to weevils. Good yields. Makes an excellent meal and flour.

Broom Millet.—Does well, from reports to hand.

Cassava.—Does well.

Canaigre.—Did well ; 1 lb. roots gave 9 lb. After seeding it can be dug up and replanted.

Cow Pea.—Very suitable ; quick and large returns. Used by many as a vegetable.

German Millet.—A very good crop. Gives large returns of seed and hay.

Raisin Grapes.—About 75 per cent. struck, and these are doing well.

Horse Beans.—Grows well, but usually fails to seed.

Kaffir Corn.—Grows well.

Lentils.—Were not very successful, often never arriving at maturity, but do fairly well in winter.

Field Peas.—Did very well. Heavy yielder.

Sweet Corn.—Not very suitable. Easily subject to the attacks of weevils and vermin. Easily hybridized.

SCHEDULE showing the NUMBER of RECIPIENTS of SEEDS DISTRIBUTED by the DEPARTMENT from 1st JUNE, 1892, to 31st MAY, 1893.

Seeds and Plants.										Southern District.	Central District.	Northern District.	Total.
Arctic Rye	...	...	...	...	...	...	...	...	...	40	2	2	44
Algerian Barley	...	...	...	...	...	...	...	...	...	53	2	...	55
Blue Grass	...	...	...	...	...	...	...	...	...	157	2	10	169
Bromus Inermis (Grass)	...	...	...	...	...	...	...	...	...	36	1	3	40
Broom Millet	...	...	...	...	...	...	...	...	...	25	...	2	27
Brazilian Stooling Corn	...	...	...	...	...	...	...	...	...	5	...	...	5
Cow Pea	...	...	...	...	...	...	...	...	...	80	...	13	93
Castor Oil	...	...	...	...	...	...	...	...	...	21	...	...	21
Coffee	...	...	...	...	...	...	...	...	...	4	...	...	4
Chicory	...	...	...	...	...	...	...	...	...	...	...	9	9
Cotton	...	...	...	...	...	...	...	...	...	15	1	3	19
Deccan Grass	...	...	...	...	...	...	...	...	...	60	...	...	60
Earth Bean	...	...	...	...	...	...	...	...	...	8	...	2	10
Flax (Linseed)	...	...	...	...	...	...	...	...	...	70	...	...	70
Honduras Broom Corn	...	...	...	...	...	...	...	...	...	8	...	...	8
Jerusalem Corn	...	...	...	...	...	...	...	...	...	37	3	3	43
Kafir Corn	...	...	...	...	...	...	...	...	...	111	1	9	121
Rice	...	...	...	...	...	...	...	...	...	52	...	23	75
Sunflower	...	...	...	...	...	...	...	...	...	15	...	...	15
Texas Oats	...	...	...	...	...	...	...	...	...	44	2	4	50
Texas Millet	...	...	...	...	...	...	...	...	...	8	...	1	9
Tobacco	...	...	...	...	...	...	...	...	...	14	...	2	16
Wattle (Golden)	...	...	...	...	...	...	...	...	...	9	...	...	9
Wheat	...	...	...	...	...	...	...	...	...	199	5	10	214
Total	...	...	...	...	...	...	...	...	...	1,071	19	96	1,186

SCHEDULE of SEEDS PURCHASED for DISTRIBUTION.

From Whom Purchased.										Plants or Seeds.
Secretary for Agriculture, Victoria	...	...	...	...	...	...	...	...	...	Grape Vines
Flax Supply Association, Belfast	...	...	...	...	...	...	...	...	...	Linseed
Per Agent-General, London	...	...	...	...	...	...	...	...	...	Agave Sisilana
Colonial Secretary, Ceylon	...	...	...	...	...	...	...	...	...	Cocoa
Brisbane Broom Manufacturing Co.	...	...	...	...	...	...	...	...	...	Broom Millet
Barteldes and Co., Kansas	...	...	...	...	...	...	...	...	...	Wheat
Barteldes and Co., Kansas	...	...	...	...	...	...	...	...	...	Grass Seeds
A. Williams, Eight-Mile Plains	...	...	...	...	...	...	...	...	...	Eucalyptus
Thomas Bragg, New South Wales	...	...	...	...	...	...	...	...	...	Wheat
S. Holmes, Kincora	...	...	...	...	...	...	...	...	...	Wheat

DEPARTMENTAL.—Many of those who during the past year have settled upon the land have had little or no previous knowledge of agriculture, and especially has this been noticeable in connection with the village settlement clauses of the Land Act. The Department has been of great service to this class of settlers, as is evidenced by the large number of letters seeking information on almost every phase of agriculture, which have entailed much thought and labour to answer, and also by the numerous applications for the bulletins issued, the demand for them being a proof of their value. The inquiries for suitable land to settle upon, noticed in my previous reports, still continue; and I do not think I am out of my province in saying that much of the selection in the past year has resulted from the information gained in this office, and this has been the case not only with our own people, but also with farmers of experience from the other colonies. Inquiries have also come from many outside parts—from Great Britain, India, America, &c.—resulting in some valuable additions to our community, some of those from the south overlanding with their household goods and chattels, and entering upon their new property with an evident knowledge of their business. In addition to the ordinary issue of bulletins, many thousand copies of the bulletin on the “Cultivation of Wheat,” by the Instructor in Agriculture, were disseminated among the farmers of Victoria, New South Wales, and South Anstralia, the result being that in addition to an increase in our farming population, quite a demand for information as to our land laws has arisen; thus the extra expense involved in postage, printing, &c., has already been more than reconped to Qucensland. Notwithstanding the late floods, agriculture was never in a better position than now, or our people more hopeful of success; new systems are being adopted, and new outlets are being found. The arrangement whereby the Department undertook the distribution of seed to flooded-out farmers imposed an excess of work on the officers when added to the regular work of the office, and the extra duties necessitated working from early morning to late at night. I have throughout the year been ably supported by the officers of the Department.

With my report I submit Reports from the Instructor in Agriculture, the Colonial Botanist, the Cnrator of the Botanic Gardens, the overseers of the State Nurseries at Mackay and Kamerunga, and of the manager of the Travelling Dairy. Appended, also, will be found statistics of Arbor Day, and of the Agricultural and Horticultural Societies and Reserves.

PETER McLEAN,
Under Secretary for Agriculture.

REPORT OF THE INSTRUCTOR IN AGRICULTURE.

SIR,—Herewith is submitted the fourth annual report of the Instructor in Agriculture, comprising an outline of operations for the year ending 31st May, 1893, with suggestions growing out of this work.

GENERAL DUTIES.

The work of the year has been, in the main, directed along lines made familiar in the experience of the past three years. In a general way these duties have embraced—Lecturing at different agricultural centres, and attendance upon conferences and other farm gatherings; the preparation of bulletins and reports on various topics referred to me; and conference personally and by letter with the very considerable number who have applied to me for counsel. The floods of February compelled the indefinite postponement of a number of lecture engagements, and more or less disarranged my plans for work in this direction. This break in the routine of ordinary duties has given time and opportunity for work in other directions, which makes the interruption not altogether a matter for regret. I have at all times felt free to give to the public, through the Press of the colony, all matters pertaining to the work in hand which seemed to me of public utility and interest. Among what may be called the new work of the year are classed a considerable number of experimental undertakings, detailed further on, and a somewhat extended examination of suggested sites for the proposed agricultural college, made in company with the then Minister for Lands, Hon. A. S. Cowley. This last work, I regret to say, has not been fruitful in result, such as the friends of agricultural education had been led to hope for from the action of Parliament in appropriating sums of money two years in succession “towards the establishment of an agricultural college.”

CONFERENCES.

Agricultural conferences, involving a series of sessions covering two or more days, have been held at Bundaberg, Rockhampton, and Mackay. At each conference I have contributed two papers, besides taking a share in the general discussions. The attendance was often large, and the interest always good. These meetings, held in regions where tropical agriculture prevails, are particularly interesting, as they serve to show the growing feeling for agriculture in the North among all classes of producers. At each conference squatters, sugar-planters, and small farmers, from the same platform, gave freely to interested audiences their experiences and the special knowledge resulting, with their plans for the future, so far as they interested the agricultural public. I doubt if such unanimous interest has been shown before, in this large and public way, in Queensland. In April I visited Sydney for the purpose of taking part in the deliberations of the Nomenclature Committee of the Intercolonial Rust in Wheat Conference. The work of the committee involved, among other things done, the examination of a very large number of sorts, with the purpose of determining their names, and the arrangement of a system for describing and naming sub-varieties.

BULLETINS.

Three of these Department publications have been prepared by me during the year, as follows:—

- Bulletin No. 19.—“Wheat Growing in Queensland,” 40 pages.
- “ ” 22.—“The Cultivation of Wheat in Queensland,” 22 pages.
- “ ” 24.—“Our Stock Foods and How to Use Them,” 20 pages.

The bulletins have been written from the Queensland standpoint alone, and with the object of aiding the Queensland farmer and the general public to a knowledge of the agricultural resources of the colony and the best means of utilising the same. Considerable editions of these publications have been distributed, and they have, besides, been extensively reproduced by the newspapers.

PROGRESS AND RESULTS.

While the year covered by this report will be long remembered as one specially disastrous to the farmer, by reason of excessive rains and floods, there are not wanting signs of substantial progress in agriculture and related pursuits. Indeed, the low prices, short crops, and damages by floods have served to emphasise the need of such better methods in farming as will minimise the effects of these ever-recurring disasters. Good times—large returns from small crops—would certainly have had the opposite effect of confirming conservative farmers in their old-time practices and prejudices. The great recent addition made to the area of successful wheat culture—North, West, and South—must be counted one of the most valuable among the signs of recent progress. There are at the present time more butter and cheese factories than ever before in Queensland, and the annual output of dairy products is enormously greater than ever before. Judging from the movements now on foot, looking to the erection of improved dairy plants, the capacity of the colony for the production of butter and cheese of the best quality, will, in the next year, be increased beyond anything known in a like period of the previous history of Queensland. There never was a time in the history of the colony when pig-raising and the related arts of pork-making and bacon-curing were carried on to the extent they are now practised in the colony. Never before have domestic fruits been utilised for preserves and the like as now. One now sees quite commonly on sale in grocers' windows fruits preserved in the various ways, the products of local skill. It is now the rule, with very few exceptions, that local agricultural shows in every part of the colony exhibit large and often very choice collections of canned fruits and vegetables, jellies and preserves, the work of the wives and the daughters of residents of the district. As all this is in direct line with the teachings of the Agricultural Department in its various agencies, that department may reasonably take to itself a share of the credit due to the initiation of enterprises of such far-reaching importance. I may be pardoned for referring here to an article by Mr. Charles Whitehead, F.L.S., F.G.S., which appeared in a recent number of the “Journal of the Royal Agricultural Society of England,” in which the Queensland Bulletin No. 5—“Canning and otherwise Preserving Fruits for the Home and Market”—is reviewed at considerable length. Speaking of the general subject, this writer says:—“The question is a very important one, not only for young colonies, but also for old countries

countries like Great Britain, whose long accustomed staple crop has ceased to be remunerative. The Queenslanders have been quick to see the advantages of the various systems dealing with fruit and vegetables that have been described, which are so profitably practised by the Americans, and there is no reason why they may not be successfully adopted in this country, both upon a large scale in factories and buildings for the purpose as well as upon a small scale in the homes of the people."

Again, referring to the paper read by Mrs. Shelton before the Beenleigh Conference, this writer says:—"It would be useful if technical education committees of county councils were to send capable teachers of the fruit-preserving industry into country districts to give lectures, like Mrs. Shelton in Queensland. These would be difficult to obtain at first, but in time capable persons would arise. I was asked lately to name someone able to give lectures on fruit and vegetable preserving, and after many inquiries I was obliged to confess that I had failed to find anyone possessing the necessary acquirements."

AGRICULTURAL SETTLEMENT.

Popular interest in this subject has certainly not abated during the year. On all hands it is admitted that the further progress of the Colony in wealth and population is largely dependent upon the settlement of a farming population upon the vast, unused areas of fertile land, publicly and privately owned in the Colony. Well nigh all the discussions of this question have, so far, turned upon the importance, to the general public, of a movement of the population landwards. Comparatively little is said of the inducements farm life offers to settlers themselves. Indeed there is, particularly among townspeople, a very prevalent idea that farming in the Colony has been and is a failure, and that the life of the farmer involves, with long hours and excessive labour, meagre and unsatisfactory financial results. My own view as stated in previous reports is, that this idea, due to ignorance of the actual condition of the farming population of the Colony, is largely erroneous. Floods and droughts, with their dreadful after effects, occur everywhere. The Mississippi, as well as the Brisbane River, overflows its banks and carries loss and destruction to thousands of urban as well as farm homes. The view, frequently stated publicly by me during the first year of my sojourn in the Colony, that the average conditions and results of farm life in Queensland are at least as favourable to the settlers, where land has been selected with judgment, as those obtained in the Western States of America has been amply confirmed by the wider observations of the last three years. There have been failures here, in agriculture, as in every other calling; but every settled section of the Colony furnishes many examples of farmers who have risen to independence through their own persevering efforts, intelligently directed. What hundreds have done in the past, may be done by thousands in the future. The facts which underlie these broad statements deserve a wider publicity than they have hitherto received.

If land settlement has not gone on among us by "leaps and bounds," it at least has made steady progress through the year. The fine agricultural district about Roma seems to be the objective point of the largest number of land-seekers, although agricultural settlement is by no means confined to this section. All the Downs section, and the cane-growing regions of the North, particularly the country about Mackay and Bundaberg, must have received during the year very considerable accessions to the number of independent small farmers. This progress of land settlement seems to me to be all that can be reasonably expected from the present population of Queensland. Successful farmers, and especially those who succeed as pioneers, are as a rule men who have been bred to farm life. It is hardly to be expected that this rule will be reversed in Queensland, and that here pioneer farmers will be had from the ranks of those who have failed in other callings. To men accustomed all their lives to the eye of the master, and a weekly pay day, farm life with its independence—which is but another term for enforced self-reliance—isolation, and often present hardships, is a dreadful alternative, to be faced only under dire necessity. Education, habits, and the weaknesses which end in self-indulgence have, in the past, dragged such men irresistibly to the cities, and will continue to do so in the future.

There are undoubted opportunities in Queensland for the skilled farmer and horticulturist: but it is not to men of this class alone that we must look for the hardy pioneers, who will open up to civilization the wild lands of Queensland. Here as elsewhere, the small farmers who find advancement impossible under the old conditions, and the sons of farmers anxious to establish themselves upon the land, must be looked to as the agents in the development of the new Queensland. What has been done in the Rosewood Scrub, at Laidley and elsewhere in the Colony, will bear repeating a hundred times over in the different sections of Queensland. To establish the beginnings, even of a stream of immigrants of this class, would be worth an effort on the part of the Government. What has so successfully been done by the Canadian Government and by American states and railways, in hundreds of instances, may surely be hopefully undertaken by ourselves. Of all the instances likely to aid in establishing confidence in the future of the Colony, and inaugurating the era of prosperity so earnestly hoped for, the influx of bodies of working men seeking land, not "work," would count for the most, and cost the least in effort of all the suggested remedies for the prevailing depression.

EXPERIMENTS.

During the year I have had opportunities for carrying out certain long-cherished plans of experimental work bearing on various matters of importance to the agriculture of the colony. These operations have in a general way embraced an experimental shipment of pines to San Francisco; tests of the effects of cold storage upon the "keeping" qualities of various tropical fruits; a milling and baker's test of certain rust-resistant wheats; and the planting of two wheat test stations, one located near Warwick and the other in the neighbourhood of Roma.

Pineapple Shipment to San Francisco.—In November last a consignment of thirteen cases of pines was made up at Nundah for shipment to San Francisco, with the purpose of testing the American market for this fruit, and the possibility of carrying pines to this distant port under various conditions as to packing. Previous to undertaking this shipment, I had satisfied myself, by a considerable number of trials made with pines kept in a cool cellar, that with a temperature approximating 60 degrees Fahrenheit the fruit would keep much more than the time occupied in this voyage to San Francisco. Our comparative nearness to California and the prevailing high prices for this class of fruit in San Francisco

Francisco made the venture an attractive one. A San Francisco dealer writes as follows concerning the wholesale price of pines at that market in different seasons:—"The average price of pineapples, from July to September, runs from 8d. to 1s. 4d. each, and the rest of the year from 1s. 8d. each to as high as 2s. 4d. They command the highest prices from October to April." In other words, pines are dearest in San Francisco when that fruit is cheapest and most abundant in Queensland. The fruit was collected by a committee of the Nundah pine-growers, who contributed it. The shipment was packed, under my supervision, in a great variety of ways, in order to test in this practical way the merits of different methods that have been recommended to shippers. Fruit, large and small, ripe and partially ripened, as well as smooth and rough-leaved sorts, were used. These were packed, well wrapped in grease-proof and ordinary paper, and both were packed in kiln-dried sawdust and in open crates. Others, again, were placed in straw envelopes and packed in sawdust, while yet others were packed in open cases, without wrappers or coverings of any kind. The fruit was in excellent condition when gathered, and all the operations of packing, and the subsequent handling and carriage to the ship, were done with great care. The consignment left Brisbane 26th November, going by ship to Sydney, reaching San Francisco—or so much of it as stood the journey—22nd December. The fruit was carried on deck as far as Sydney, and from thence to San Francisco in a well-ventilated hold "in the coolest part of the ship." I have abundant reasons for believing that every attention was given this fruit by the officers of both companies having it in charge. Withal the shipment was a failure. It left Brisbane in the midst of quite the hottest weather of the season, and without doubt it was in a region of high temperatures almost to the end of the voyage. Under such circumstances the fruit ripened, and then went rapidly to decay. The steward of the ship carrying the pines from Sydney to San Francisco reports as follows upon the behaviour of the differently packed lots, and the consignment as a whole:—"This shipment was placed in the coolest part of the ship, a current of air being upon them at all times. Nine days after leaving Sydney we had the cases overhauled, and found many of the pines decayed; after picking out the bad ones, we had the cases repacked. Six days later we again sorted them, and found over half of them in an advanced state of decay, the whole of the remainder being fully ripe. We fear that none will reach San Francisco in good order, but did not examine them after the 13th. Find the pines packed in straw decayed quickest. The large ones [most likely smooth-leaved, E.M.S.] did not last as well as the small ones. Those packed in sawdust did not do well; in fact, those with no covering lasted longer than any others. Pines should be shipped in open cases, giving them all the air possible."

The consignee writes as follows of the fruit as he received it:—"By the time I received the invoice there were six full crates and five empty, but the full ones might as well have been empty, as their contents were over-ripe. The statements of the purser are very correct. The pines not wrapped at all were in the best order. *Pineapples, as a rule, should be placed in open crates, so as to allow a current of air to continually pass through them.*"

This, in brief, is the history of the first shipment of Queensland fruit to San Francisco. Its failure, in the hot weather that the fruit encountered from the first, was a foregone conclusion. No method or system of packing could have averted the catastrophe, I am persuaded. Ships equipped with cold storage accommodations will some day enable our fruit-growers to use such promising markets as the Californian; but until then we must wait.

Cold Storage of Tropical Fruits.—The experience of last year had, in connection with the shipment of pines to San Francisco, determined me to test as far as possible, with the means available for this purpose, the influence of low temperatures upon the keeping qualities of pineapples and other Queensland fruits. To this end Mr. Reid, of J. C. Hutton and Co., generously placed at my disposal space as required, in one of the chilling-rooms of the company's bacon factory, located at Zillmere. This chilling-room is in constant use for the purpose of reducing the temperature of large masses of pork kept in a room beneath. The chamber maintained a very uniform temperature of 43 to 45 degrees Fahr., which is fully 8 degrees lower than I consider to be necessary or desirable for the class of fruits under experiment. The excessive humidity of this chamber was also an objection so far as the present work is concerned. Early in April of the present year three cases of pines and three large bunches of bananas were placed in the chilling-room at Zillmere, and one week later a box of passion-fruit was added to the collection. The pines were generally under-ripe, although well matured, while a few were fairly well ripened. The three bunches of bananas—one each of the plantain, sugar, and Cavendish varieties—were well matured, a few of the fruit of each bunch being quite yellow. The passion-fruit were in bad order to begin with; they were procured in the markets with difficulty in this off season, and had suffered much in handling. An examination of all the fruit at the end of a fortnight showed the pines and passion-fruit unchanged, and the bananas slightly altered in the direction of increased ripeness. A week later there was no noticeable change in the pines or passion-fruit, but the bananas were badly streaked with black. At the end of a month the pines were in perfect condition, except one of the smooth-leaved variety, which evidently had been badly bruised before the experiment began, and was exuding juice in considerable quantity. The passion-fruit was in as good condition as when placed in the chamber, but the bananas were badly blackened and seemingly worthless, on which account they were removed from the cooling-chamber. I am convinced that the temperature of the chamber was too low and the moisture too great for this fruit. At the end of the seventh week (the sixth of the passion-fruit) the pineapples were still in fairly good condition. They were at this time shown to several gentlemen, who pronounced them marketable fruit. The greener ones seemed slightly darker than at first, and the ripe were somewhat faded, while a trace of mould was discernible on all; but on cutting, the fruit was well coloured, juicy, and, as far as can be estimated, as sweet as on the first day of the experiment. The passion-fruit at this time were in quite as good a condition as the pines; every specimen that had been put away sound was sound and well flavoured at the end of the six weeks' trial. It is interesting to note that pines identical with those used in the experiment, when left exposed to ordinary outdoor temperatures, ripened fully in one week, and in two weeks were over-ripe and scarcely edible. Passion-fruit hermetically sealed and kept one month at the ordinary temperatures became a mass of mould, and utterly worthless. These experiments are so interesting and suggestive as to warrant a digression. Ordinarily, the chief crop of pines in this colony ripens and is marketed between October and March. At that season most

of what may be called the commercial fruits of the colony, except those of the Citrus tribe—bananas, grapes, passion-fruit, and mangoes, to say nothing of tomatoes, cucumbers, and melons, are in full fruitage. Growers of these fruits, excepting grapes, find their principal markets at the southern cities, Sydney and Melbourne. The schedule time of the coastal steamers to Melbourne is—from Cairns thirteen days; and from Brisbane, five days. This time is not unfrequently extended several days by the accidents and delays incident to a coastal trade involving many ports of call. Every fruit-grower understands that this thirteen days, and indeed much less time, in the heated term, carried as the fruit is in a reeking hold or in stacks on an unshaded ship's deck, is sufficient to bring ripe fruit to a condition of unsalable over-ripeness. In case of the delays referred to above the loss is often total. During the prevalence of the floods of February, when steamers were detained variable periods along the coast, tons of pines and other fruits rotted on the ships, and were thrown overboard. It was reported in the newspapers some time ago that a cargo of Cairns bananas reached Melbourne in such condition that the ship was relieved of the decaying mass by pumping. The fruit-growers, not merely of the North, but those resident about Brisbane even, have long known, after much expensive experience, that it will not do to ship to the southern markets ripe, full-flavoured fruit. In this way it has come about, that Queensland fruit is known to our southern customers only through the wilted, undeveloped, ill-flavoured articles which the present system forces us to unload upon these markets. It is not surprising that Sydney and Melbourne dealers hasten to assure customers that the fruit they offer is not from Queensland. There is one remedy, and only one, for the existing unsatisfactory state of trade in Queensland farm and orchard products, and that is cold storage on the coastal and over-sea steamers doing business with Queensland ports, supplemented by refrigerator cars on the Government railways. As it is, our butter is converted into rancid oil in the journey from Brisbane to Townsville; fruit bound for Northern ports is also badly damaged in the long journey; while meat, except on foot, is not transported unless cured in some form. As it now is, the vast ocean of warm water about us is an impassable barrier to foreign trade in the most important of our agricultural and pastoral produce, wool and sugar excepted. Our Zillmere experiment points straight to the remedy for the existing most unsatisfactory state of affairs. With cold storage our surplus of fruits may be placed upon the great markets in all their original freshness and flavour; butter and cheese and meats kept cold will keep sweet and toothsome to the end of the longest voyages. Cold storage in the ships that do business on our coast and on the rolling stock of the main arteries of inland trade is the next step in the development of trade, in that numerous class of perishable articles which Queensland cultivators can profitably produce in competition with the world.

There is much talk just now of a foreign market for Queensland butter and cheese. With existing transportation facilities, butter is as impossible of export as meat. It not only demands cold carriage on the ship, but it must be kept firm, through the influence of cold, from the minute that it leaves the churn. Butter that is allowed to become grease in the dairy, the railway truck, or the storeroom, whatever its subsequent treatment on shipboard may be, cannot again by any known process or art be made a first-rate article in any European or other market where good and bad butter are recognised at their worth. The rapid increase of dairy factories points clearly to the near day when we shall much more than meet our own requirements in these articles. Already many enterprising dairymen are inquiring anxiously for the means by which the English markets may be supplied with a share of the glut of butter and cheese which even now burdens our own at certain seasons of every year. With the existing transportation accommodations the beginnings of this trade are impossible. It is a pleasure to be able to state that the manager of one of the great steamship companies doing business in Queensland is alive to the growing needs of the trade in this respect. He gives the assurance that whenever the farmers and fruit-growers of the colony are prepared to guarantee the use of cold storage chambers on the coastal steamers, these will be provided. This demand seems a reasonable one, considering the first great cost of the machinery and fittings of cold storage on ship board. On the other hand, the companies can hardly expect a trade to be born full-grown. This seems to be a case in which a consideration of the general requirements of the trade, and the clear interests of both parties to it, will justify enterprise on the part of the company. For the present one steamer, making trips not farther apart than one month, would perhaps meet the wants of the trade, and show its possibilities in the future. More than anything else, there is needed an earnest public sentiment in Queensland, demanding modern facilities for the transportation of perishable products, and a disposition on the part of producers to co-operate with the shipping companies in using such appliances when secured. During the coming year I hope to be able to help Queensland producers to an appreciation of the vast importance of this subject to them.

MILLING AND BAKING TESTS OF WHEAT.—An important part of the work of the year has been the seeking out of sorts of wheat that, in Queensland or elsewhere, have shown constitutional ability to resist the rust contagion. It has thus been made apparent that in each of the Australian colonies and in the different countries, particularly those of Southern Europe, there are varieties in high local repute in this particular*. In Queensland several sorts have attained to great popularity on account of their rust-resistant qualities. Among these the Belatourka, introduced by this Department in 1888, the Egyptian or Mummy, a long-established sort, are reckoned among the best. Unfortunately the millers have in the last year insisted upon the farmers accepting a reduction in the price of the Belatourka and the Egyptian, on the grounds:—1. That they were hard wheats, and so demanded extra machinery and attention in grinding; and, 2. That the flour made from these wheats was inferior, particularly in respect to colour. These objections, I may add, have only recently been raised. The Belatourka, when first introduced, was pronounced a "first-class milling wheat," and, until the present season, both this sort and the Egyptian have commanded the highest prices. This discrimination in prices has been a source of much complaint, and officers of the Department have come in for a share of criticism, for having recommended these sorts to wheat-growers. Under the circumstances, it seemed worth while to undertake a thorough, and, as far as possible, accurate test of the milling and baking qualities of these wheats, in comparison with the Canning

Downs

* Many of these sorts—upwards of 300 all told—have been secured, and are now growing at the wheat-test stations established near Warwick and Roma.

Downs Rust Proof, another rust-resistant sort against which no objections have been raised. I here present only the outlines and general results of this interesting trial, reserving a statement of the details of the experiment for a bulletin now in course of preparation. The grinding was undertaken by the Brisbane Milling Company, Mr. A. F. Luya, the managing director, kindly undertaking to give the work his personal attention. The flour was baked into bread by the baker of the Benevolent Asylum, Dunwich, and small amounts were tested by a number of ladies resident in Brisbane. Forty bushels of each sort were employed in the milling test, and 200 lb. each of Egyptian and Canning Downs, and 250 lb. of Belatourka flour were used in the baking test at Dunwich. Speaking of the behaviour of these three varieties of wheat, in milling, Mr. Luya in his report says:—"You will notice that each variety gives an excellent return, *very much better than the average wheat sent from the Downs* to this market. The percentage of yield from Belatourka and Mummy-Egyptian is high in both cases, and there is a great similarity in the hardness of the two. At the same time, while being first class grains, they are not wheats to be treated alone in milling, not only on account of their hardness, requiring more rolling surface than is generally used, but also on account of a yellow tinge in the flour, making a dark although sweet loaf." The results of the baking tests have not yet been reported in full; but, so far, the trials reported show that the Belatourka makes a peculiarly sweet and handsome loaf, which has been unanimously commended by a considerable number of people who have examined bread made from flour of this sort. It certainly works into a bread having a peculiar golden tinge, which, I am sure, will be preferred by most unprejudiced persons to the ashen white loaves, the product of the starchy soft wheats. For pastry purposes this sort seems particularly well suited, both on account of its colour and the "short" flaky crust it gives. Unquestionably, these sorts require the best machinery and special care in grinding; and, as Mr. Luya points out, most likely they will be used to best advantage in mixing with the soft starchy sorts. Whether the peculiar qualities of these wheats justify a reduction in the market price for them is a point that I am not now prepared to discuss. Undoubtedly those millers who have not an equipment of modern machinery find it difficult to make the most of these horny wheats, but with modern mills the case is quite different. It is difficult to understand why wheats able to show the advantages undoubtedly possessed by both the Belatourka and Egyptian wheats should be relegated to a secondary position in the market. Be this as it may, I have no hesitation in advising farmers who have found these sorts satisfactory to continue their cultivation, even though they are compelled to stand a reduction of 2d. or 3d. per bushel in the price received for them. This is another case of the half loaf that is better than no bread. Two or three pence per bushel seems a heavy cut into the profits of the crop, but if these sorts are superior to others, as is claimed with strong justification, then the amount by which the price has been diminished may be counted as a not extravagant insurance rate on the crop.

Wheat Culture Experiments.—Upon the Canning Downs Estate of Hon. Jno. D. Macanish, located near Warwick, and upon the farm of Mr. P. Smith, near Roma, small wheat test stations have been established and duly planted. At Canning Downs 170, and at Roma 102, distinct varieties have been sown. These wheats, in many cases, are recently formed crossbreds, the progeny of varieties of recognised value. The collection also embraces many standard varieties of several Australian colonies, European countries, and American States. These have been planted in rows one foot apart, the total area given to each sort varying considerably. For a complete list of the varieties planted at these stations, see Appendix A. It is the present plan to carefully test these sorts, continuing in cultivation, on increased areas of ground, varieties which by these trials are shown to possess qualities which make the sorts worth perpetuating.

THE AGRICULTURAL COLLEGE.

The high hopes raised by the action of Parliament in voting, two years in succession, a sum of money to be used in establishing a school of agriculture ended in disappointment. The numerous reverses which have overtaken the colony during the year for the present make the task of reviving the project a difficult one. I am at least hopeful that, with the return of better times, Queensland people, of all classes, will unite in securing for the colony an institution which, if rightly managed, will do for the agricultural class what universities have done elsewhere for the learned and professional classes.

ACKNOWLEDGMENTS.

The considerable number of publications received during the year by the Instructor in Agriculture are hereby thankfully acknowledged. The following is a complete list of periodicals received during the year covered by this report:—*Agricultural Gazette*, New South Wales Department of Agriculture; *Australian Pastoralist*, Brisbane; *Louisiana Planter and Sugar Manufacturer*, New Orleans, U.S.A.; *The Sugar Journal and Tropical Cultivator*, Mackay, Queensland; *Martin's Farm and Home*, Sydney, N.S.W.; *The Industrialist*, Manhattan, Kansas, U.S.A.; *Journal of the National and Industrial Association*, Brisbane; *Insect Life*, Department of Agriculture, Washington, U.S.A.

In addition to the above, miscellaneous reports and bulletins of great value have been received from the United States Department of Agriculture and the experiment stations of the different American States and the Australian colonies.

My acknowledgments are due to the clerical staff of the Department for much and valuable assistance always courteously rendered.

Respectfully submitted,

E. M. SHELTON,
Instructor in Agriculture.

Brisbane, 31st May, 1893.

APPENDIX A—continued.

WHEAT EXPERIMENTS.

List of wheats planted on farm of Mr. Smith, near Roma, 17th to 19th May, 1893, inclusive. Plats numbered in order from the east. Where two or more names separated by a × are given, a variety (unnamed) made by crossing these sorts is indicated :—

Plat 1— <i>a</i> King's Jubilee × Zimmerman, <i>b</i> Quartz × Leak's	Plat 46, 8 rows—Australian Wonder
„ 2—Blount's Fife × Vermont	„ 47, 4 „ Velvet Chaff
„ 3— <i>a</i> King's Jubilee × Early Japanese, <i>b</i> King's Jubilee × Indian B.	„ 48, 4 „ Goldsmith's Pedigree
„ 4— <i>a</i> Jacinth × Ward's Prolific, <i>b</i> Amethyst × Indian D.	„ 49, 6 „ Cook's
„ 5— <i>a</i> The Blount Wheat × Early Japanese, <i>b</i> King's Jubilee × Indian G.	„ 50, 6 „ King's Jubilee
„ 6—Improved Fife	„ 51, 4 „ Golden Drop
„ 7—Anglo-Australian	„ 52, 10 „ Brown Eared Mummy
„ 8— <i>a</i> Ward's White × Horneblende, <i>b</i> Steinwedel × Early Japanese	„ 53, 4 „ Northern Champion
„ 9—Blount's Lambrigg × Horneblende × Horneblende	„ 54, 4 „ Gore's Indian No. 1
„ 10—King's Jubilee × Tourmaline	„ 55, 4 „ Gore's Indian No. 2
„ 11— <i>a</i> Horneblende M. × Indian B., <i>b</i> Jacinth × Early Japanese	„ 56, 4 „ White Fife
„ 12— <i>a</i> Bellevue Talavera, <i>b</i> Jacinth × Ladoga	„ 57, 6 „ Sicilian Baart
„ 13— <i>a</i> Horneblende × Indian Y., <i>b</i> Steinwedel × Amethyst × Horneblende	„ 58, 12 „ Leak's
„ 14—Quartz	„ 59, 6 „ White Hogan
„ 15—Lazistan	„ 60, 4 „ White Tuscan
„ 16—White Naples	„ 61, 10 „ Medeah
„ 17, 2 rows—Belatourka	„ 62, 4 „ Broderick
„ 18, 4 „ Fluorspar	„ 63, 4 „ Town and Country
„ 19, 2 „ District	„ 64, 6 „ Russian
„ 20, 4 „ Bega	„ 65, 4 „ White Cytheré
„ 21, 6 „ Ward's Prolific (Marshall's White)	„ 66, 4 „ Champion Hybrid
„ 22, 4 „ Niagara	„ 67, 4 „ Fountain
„ 23, 6 „ Square-headed Sicilian	„ 68, 2 „ Steinwedel
„ 24, 6 „ Manitoba	„ 69, 2 „ Early Nott
„ 25, 6 „ Rattling Tom	„ 70, 4 „ Victorian Defiance
„ 26, 6 „ Tourmaline	„ 71, 4 „ Queensland Defiance
„ 27, 4 „ Thomas's Rust Proof	„ 72, 4 „ Defiance—source unknown
„ 28, 4 „ Summer Club	„ 73, 6 „ Algerian
„ 29, 6 „ Blount's Fife	„ 74, 6 „ Currell
„ 30, 4 „ Canning Downs Rust Proof	„ 75, 6 „ Polish
„ 31, 6 „ Mexican Spring	„ 76, 16 „ Blount's No. 10
„ 32, 1 „ Freeling	„ 77, 8 „ Frampton
„ 33, 1 „ “31M” Wheat	„ 78, 4 „ White Lammas
„ 34, 1 „ 8M Ateini Wheat	„ 79, 4 „ Indian Pearl
„ 35, 1 „ 3M Wheat	„ 80, 4 „ Chrysolite
„ 36, 6 „ Talavera	„ 81, 4 „ Australian Club
„ 37, 6 „ Jacinth	„ 82, 4 „ Indian Pearl
„ 38, 6 „ Early Para	„ 83, 4 „ Fultz
„ 39, 8 „ Smith's Nonpareil	„ 84, 4 „ New Windsor Forest Red
„ 40, 2 „ White Essex	„ 85, 1 „ Barley
„ 41, 6 „ Red Californian	„ 86, 2 „ Egyptian
„ 42, 6 „ Fill Bag	„ 87, 2 „ Blue Drop
„ 43, 6 „ Farmer's Friend	„ 88, 4 „ Little Wonder
„ 44, 8 „ King's Jubilee	„ 89, 2 „ Ward's Prolific
„ 45, 6 „ Australian Glory	„ 90, 4 „ Red Provence
	„ 91, 2 „ White Essex
	„ 92, 4 „ Early Japanese.

Two rows Purple Straw planted on east side; inner row Large Purple Straw, outer Common Purple Straw.

REPORT OF THE COLONIAL BOTANIST.

Department of Agriculture,
Office of Colonial Botanist,
Brisbane, 1st June, 1893.

SIR,—I have the honour to submit the following report as to state of and work accomplished in Herbarium, Museum, Library, and work generally appertaining to the office of Government Botanist for the year 1892-3.

I would, in the first place, like to point out that in these reports a very large and important amount of work done by persons in my position cannot be shown. I refer to the time given to persons calling at the office for advice and information appertaining not only to scientific botany but matters affecting plant life generally; such, it will be seen, does not appear in the ordinary office correspondence. It is, however, important work, and, I hope, of benefit to the colony. Many persons prefer a personal interview than corresponding by letter.

The unprecedented high floods and continued wet during the year have given much trouble, and in some instances loss, both in the Herbarium and Museum, by the specimens becoming mildewy, especially where such were near any outer wall. It is a matter for congratulation that a lower floor of the building, which was to have been prepared for museum purposes, had not been begun, for in the highest flood it was many feet deep in water. I pointed out at the first, and may again state, that no rooms below the earth's surface are suitable for the reception of specimens of the vegetable kingdom, as during wet weather such places always become more or less damp, and the exhibits, therefore, mildewed. In the present instance, had the room been finished and received the exhibits intended for it from the first floor, the loss would probably not have been less than £1,000 to the colony.

The Museum is becoming more generally known, and the instructive exhibits are continually being consulted by those whose professions or trades require the use of products or articles derived from the vegetable kingdom. This department is constantly being added to; and where articles may have been to any degree damaged by damp, such, if not already replaced, will be on the first opportunity. I much regret

regret the almost total loss of the large and instructive collection of cereals, in the straw and ear, which were displayed upon one of the walls, by the long-continued rains. The grain in glasses, of course, was not injured; but exhibits of this kind are not of so practical a character as when the whole plant is shown. It will be my endeavour to have a replacement of the former as soon as possible; and in the next exhibit, if possible, the roots will be attached. In October last a fine collection of New Zealand timbers was received from the School of Mines, Adelaide, and a number of ours were sent in exchange.

By referring to the list herewith you will notice that the Library has been considerably added to since last report, and in a few days I hope to receive a number of books which have been ordered from London.

A large number of plant specimens have been received from private persons, who forwarded such for the purpose of obtaining their names or other information regarding them. By this means the flora of the colony is slowly but steadily being worked up, and from time to time new or fresh plants are brought to our knowledge, all of which will be found recorded with any interesting matter that may be known of their properties in my Botany Bulletins.

I have continued to prepare for publication bulletins giving accounts of all additions made to our knowledge of the Queensland Flora. The fifth Botany Bulletin, to which I made reference in my last report as being in the hands of the Printer, has been issued, as well as the cheap illustrated work on our indigenous ferns. This latter, as I anticipated, has been eagerly bought up by the fern-loving public. Bulletin No. 6 I devoted entirely to fresh-water algæ, taking occasion of the nearly one hundred additional species for our flora to make the bulletin, as far as possible, an introduction to the study of these organisms by giving a full account of their life history. It is gratifying to me to find that my labour has not been in vain, and that persons are now engaging in the study. Botany Bulletin No. 7, recording additional plants, was issued immediately after the one on algæ, and Bulletin No. 8 is now partly printed. The latest pamphlet from my department has been "A Companion for the Queensland Student of Plant Life." I have long considered such a work wanted, and have so arranged the contents that it may be used as an introduction to botany and ready help to the reading and understanding of works upon plant life generally. Here and there will also be met with notes on horticultural matters, &c.

Exchanges of herbarium specimens have been made with similar institutions in Europe, America, Noumea, and various Australian colonies. At the request of a correspondent in the United States, I had mounted 200 specimens of the weeds of cultivation in Queensland, which he required for an exhibit he was preparing of the weeds of the world for the Chicago Exhibition.

The following are the naturalised plants observed during the past year:—

BRASSICA (Sinapis) LEVIGATA, Linn. (Cruciferae).—Smooth mustard. This rape-like plant seems to have been introduced in some samples of seed-wheat, and I must say most carelessly sown upon a farm, for the farmer wrote to the Department saying that his wheat crop was overrun with it, and asking how was he to get rid of it. One would have thought that he should have seen, as any practical man would have done, that his seed was clean before sowing; or, having neglected so doing, surely he might have weeded the plant out at an early state of growth, as the most dense of farm servants could distinguish between this weed and the wheat plant.

CASSIA ALATA, Linn. (Leguminosae).—This tall shrub is overrunning the country in the Barron River district.

CITRUS (Rutaceae).—Mr. A. Norton informs me that in the Port Curtis district the West Indian Lime and the Lemon have become naturalised, and in many places formed fine trees and fruit abundantly. These have all sprung from the seeds of a few trees which were taken to the district by Mr. Norton in 1862. The mode by which the seeds have been distributed is, that bushmen have been in the habit of taking out the limes to add the juice to their tea instead of milk.

CORIANDRUM SATIVA, Linn. (Umbelliferae).—The Common Coriander is becoming a weed about Brisbane.

ECBALLIUM ELATERIUM, A. Rich (Cucurbitaceae).—The Squirting Cucumber. Professor E. M. Shelton found this to be abundant along the banks of the Condamine River.

HYPOCHERIS GLABRA, Linn. (Compositae).—A weed which has been long known in our pastures and cultivation, but escaped being noticed in any of my publications until the past year.

MELILOTUS ALBA, Linn. (Leguminosae).—The White Melilot. On some farms is now as common as *M. parviflora*.

PEPLIS PORTULA, Linn. (Lythrarieae).—The Water Purslane, is a great pest amongst pot plants when kept in damp bush-houses, &c.

RICHARDSONIA SCABRA, Linn. (Rubiaceae).—A weed of cultivation at Kamerunga.

SALVIA COCCINEA, Benth. (Labiatae).—From Mr. A. Norton I hear that this plant, a showy weed abundant on rubbish heaps about Brisbane, has become a prolific weed on the pasture lands in the Port Curtis district.

The following suspected poisonous plants are additional to those already recorded:—

DAMPIERA STRICTA, VAR. OBLONGATA.—Mr. James Irving, V.S., reports having received this plant from a selector at Mount Cotton with a note stating that it was suspected as causing the death of several cows. This is hardly probable, as the order to which it belongs is not known to possess poisonous properties. I may here remark that little reliance can be placed upon the reports which come to hand regarding these suspected poison plants, on account of the haphazard way the specimens are collected which are forwarded for identification; those sent are often quite harmless plants. For instance, during the past year samples of the Weeping Myall (*Acacia pendula*) and *Geodorum pictum*, a terrestrial orchid, have been received as suspected of causing the death of animals browsing upon them. The first of these has saved the lives of stock in times of long drought, and the latter belongs to a family not so far as known to contain a poisonous plant; but the stems of many furnish valuable nutritious food. Still, when a plant is forwarded to me as a suspected poison, I consider it my duty to report such in these reports.

In addition to those mentioned in former reports, the following Fungus Blights have been observed upon either indigenous or cultivated plants:—

ÆCIDIIUM DEERINGIÆ, Cke. and Mass.—This new species of Clustercup was met with at Gladfield, by C. J. Gwyther, on the foliage of *Deeringia celosioides*, an Amarantaceous plant.

DIPLODIA MARSDENIÆ, Cke. and Mass.—This, in company with *Phoma folliculorum*, Less., was found infesting folicles of a species of *Marsdenia* sent for determination by E. J. Banfield, of Townsville. Amongst other fungus blights, it may be remarked that *Puccinia malvacearum* was very destructive to plants of *Malva*, both in garden and field. Strawberry plants were more or less subject to *Phyllosticta Fragariæcola*, Desm. On the Dogwood shrubs (*Jacksonia scoparia*) growing about Eumundi, I noticed the *Ræstelia polita*, Berk., in great abundance, and quite changing the general appearance of the shrub. On some young Oaks at the Brisbane Botanic Gardens a species of *Oidium* and some *Microsphaeria* were found disfiguring the foliage.

In conclusion, I would ask for a continuance of the votes for the purpose of Botanic Library, and for obtaining and preparing exhibits for the Museum, both being absolutely necessary for the efficient working of the Botanic Department of the colony.

A list of the works added to the Library since last report will be found in Appendix A, and the names of donors to the Herbarium, and of those with whom exchanges have been made, will be found in Appendix B.

I have, &c.
F. M. BAILEY,
Colonial Botanist.

APPENDIX A.
QUEENSLAND BOTANIC LIBRARY—ADDITIONS SINCE 1891 REPORT.

Title.	Author.	Vols.	Parts.	Title.	Author.	Vols.	Parts
Agricultural Gazette of New South Wales	King	...	12	Icones Plantarum	Hooker	...	4
Annals of Royal Botanic Gardens, Calcutta	...	1	...	Iconography of Candolleaceous Plants	Mueller	...	1
Agricultural Record, Trinidad	...	...	1	Icones Fungorum	Berlese	...	2
Botanical Magazine	...	...	8	Illustrations of Flora of Islands of the Pacific	De del Castillo	1	...
Botanical Cabinet	Loddiges	20	...	Lichens of Victoria	Wilson	1	...
Bibliography of Australian Economic Botany	Maiden	1	...	Lithograms of the Ferns of Queensland	Bailey	1	...
Bulletin of Cornell (U.S.A.) University	...	...	6	New Ferns	Baker	1	...
Bulletin of University of Wyoming (U.S.A.)	...	...	2	Report of Botanic Gardens, Grenada	...	1	...
Bulletin of Mississippi (U.S.A.) Ag. College	...	...	3	Report of Smithsonian Institution	...	1	...
Bulletin of Royal Gardens, Kew	...	2	9	Report of Natal Botanic Gardens	Wood	1	...
Bulletin of Botanical Department, Jamaica	...	...	6	Scientists' International Directory	Cassino	1	...
Cistineæ	Sweet	1	...	Sylloge Fungorum	Saccardo	1	...
Flora of New South Wales	Moore	1	...	Science Gossip	...	...	4
Flora, Peoriana	Breudel	1	...	Transactions of Acclimatisation Society of Queensland	...	...	2
Flora of British India	Hooker	...	1	Voyage of the "Bouité"	Gaudichaud	3	...
Flowering Plants of Great Britain	Pratt	4	...	Victorian Naturalist	...	2	1
Fungi, Mycetoza, and Bacteria	De Bary	1	...				
Grevillea	...	...	3				
Gardener's Chronicle	...	...	16				
Grasses of Tennessee	Scribuer	...	1				
Handbook of Australian Fungi	Cooke	1	...				

Brisbane, 1st June, 1893.

APPENDIX B.

NAMES of DONORS to HERBARIUM and MUSEUM, or PERSONS with whom EXCHANGES have been effected during the Year.

Agricultural and Horticultural Society, Calcutta	Coles, Rev. J., Madagascar	Guilfoyle, W. R., Melbourne
Armstrong, R., Warwick	Coghlan, J., Glenormiston	Gordon, P. R., Brisbane
Askenasy, E., Heidelberg, Germany	Cameron, J. S., Brisbane	Gardiner, T. R., Walsh River
Abbott, F., Hobart	Chief Secretary, Sydney	
Botanical Department, Jamaica	Costello, J. M., Mackay	Halstead, B. D., New Brunswick, U.S.A.
Bichard, J. P., Brisbane	Cordingly, J., Brown's Plains	Harding, R. R., Toowoomba
Buchanan, D., Mackay	Crooke, S., Allora	Hann, F. H., Lawn Hill
Botanic Gardens, Seebpoor, India	Colonial Museum, Haarlem, Holland	Hart, J. H., Trinidad, W.I.
Botanic Gardens, Grenada	Cornell University, United States	Ingham, T., Rockhampton
Burstall, F. W., Northampton	Debney, G. L., Monkira	Jacobson, G., Musgrave
Barton, C. H., Maryborough	Douglas, Hon. J., Thursday Island	Johnson, G., South Pine
Brooks, J., Craigie, N.S.W.	Department of Agriculture, Sydney	Jamieson, G. H., Punjab, India
Buffum, B. C., Laramie, U.S.A.	East, J. J., Adelaide	King, Dr. G., Calcutta, India
Banfield, E. J., Townsville	Fawcett, J. W., Jamaica, W.I.	Keys, James, Bundaberg
Beal, Dr. W. J., Michigan, U.S.A.	Forrest, Hon. E. B., Brisbane	King, H. V., Gowrie
Boettger, F., Peoria, U.S.A.	Finucane, W., Brisbane	Lovell, Miss S., Sandy Cape
Botanic Gardens, Bangalore, India	Gregory, C. W., Brookfield	Linnean Society of N.S.W., Sydney
Baneroft, Dr. J., Brisbane	Geitzelt & Co., A., Townsville	Lyon, W. S., Los Angeles, U.S.A.
Baneroft, Dr. T. L., Brisbane	Gwyther, C. J., Gladfield	
Cowley, E., Kamerunga		

APPENDIX B—continued.

NAMES of DONORS to HERBARIUM and MUSEUM, or PERSONS with whom EXCHANGES have been effected during the Year—continued.

Moore, C., Sydney	Public Library, Melbourne	Sturtevant, E. D., California, U.S.A.
Martin, Mrs. W., Brighton, Victoria	Plant, C. F., Charters Towers	Shelton, Professor, Brisbane
Macansh, Hon. J. D., Canning Downs		
Mississippi Agricultural College, U.S.A.	Royal Gardens, Kew	Turner, F., Sydney
Maiden, J. H., Sydney	Roe, R. H., Brisbane	Tepper, J. G. O., Adelaide
Museum, Noumea		Tracey, S. M., Starkville, U.S.A.
Mueller, Baron F. Von, Melbourne		Tryon, H., Brisbane
Maynard, J. H., Brisbane	Shirley, J. F., Brisbane	
McGregor, Sir Wm., New Guinea	Simmonds, J. H., Brisbane	University of Wyoming, U.S.A.
Mitchell, R., Fraser's Island	Scribner, F. L., Tennessee, U.S.A.	
Matthews, W. E., Stawell, Victoria	Smithsonian Institute, Washington, U.S.A.	Vasey, Professor, Washington, U.S.A.
MacMahon, P., Brisbane	Steedman, W., Mackay	
Marriage, J., Yangan	Schneider, H., Nerang	Wilson, Rev. F. R. M., Kew, Victoria
McBride, J., Enoggera	Simson, A., Launceston	Watt, W., Freestone Creek
Meston, A., Brisbane	Soutter, W., Brisbane	Williams, A., Eight-Mile Plains
	Smith, Dr. P., Dunwich	Wedd, J., Wellington Point
Nordstedt, O., Lund, Sweden	Sprigg, H. G., Victoria Plains, W.A.	Wood, J. M., Natal
Norton, — A., Brisbane	Stone, John, Kedron	Walter, C., Melbourne.
Newell, J., Herfberton		

REPORT OF THE CURATOR, BOTANIC GARDENS.

SEASON.—With the exception of the months of February and March, 1893, the weather during the year has not been unfavourable for horticultural work. An analysis is given below of the daily meteorological observations, which have been carefully taken at the observatory established here three years ago :—

RESULTS of METEOROLOGICAL OBSERVATIONS made at BOTANIC GARDENS, BRISBANE.

Month, 1892.	Dry Bulb.	Mean Temperature.	Mean Maximum.	Mean Minimum.	Daily Range.	Absolute Maximum.	Absolute Minimum.	Absolute Range.	Prevailing Wind.	Force.	Amount of Cloud.	Rainfall.	No. of Wet Days.	Greatest Fall in One Day.	Date of Greatest Fall.
June	57·6	59·8	69·5	50·0	19·5	76·5	38·3	38·2	S.W.	2·8	4·0	3·520	7	1·880	14th
July	56·2	57·6	69·1	48·5	20·6	76·0	39·7	36·3	S.W.	2·3	3·6	0·870	7	0·360	31st
August	58·3	60·2	72·7	47·6	25·1	83·0	50·5	32·5	S.W.	2·2	1·7	0·590	3	0·330	26th
September	64·4	63·4	73·5	53·3	20·2	85·6	45·5	40·1	S.W.	1·6	5·0	1·840	10	0·500	3rd
October	71·7	69·6	78·8	60·4	18·4	90·0	49·9	50·1	S.W.	2·0	5·0	5·665	10	1·880	16th
November	76·0	72·3	82·2	62·4	19·8	92·0	55·5	36·5	S.W.	1·5	4·7	2·785	8	1·290	10th
December	78·4	75·9	85·9	65·8	20·1	96·4	59·9	36·5	S.W.	1·4	4·5	7·965	11	1·540	25th
1893.															
January	76·8	75·3	83·8	66·8	17·0	94·8	56·1	38·7	S.E.	1·8	6·4	9·720	12	3·980	21st
February	(record for this month destroyed during flood.)														
March	72·4	72·3	79·2	65·1	13·8	85·0	57·5	27·5	S. and S.W.	1·3	6·5	6·705	17	1·610	31st
April	66·9	68·7	77·8	59·5	18·3	85·5	50·0	35·5	S.W.	1·3	4·0	2·090	8	0·900	15th
May	61·7	64·4	74·7	54·1	20·6	83·6	45·5	38·1	S.W.	1·3	3·8	2·210	10	1·270	31st

* Beaufort's Scale, 0 to 12, or 3 to 90 miles per hour.
† Standard Scale, 0 to 10, or clear to completely overcast.

FLOODS.—On the 5th February, 1893, a disastrous flood covered the greater part of the Gardens, doing immense damage. This flood was repeated a fortnight later, on 19th February, and between these floods, and for some time afterwards, the low-lying portions of the Gardens were sodden with moisture. The result was the entire destruction of all herbaceous plants in the lower portions of the grounds, and such was the moist condition of the soil that such plants as pelargoniums, verbenas, and the host of flowering plants used in bedding, were killed in every part of the Gardens.

In the flood of 5th February the current swept across the point upon which the gardens are situate, and its force was terrific. My residence was toppled over, and my private collection of books, all my furniture, as well as all office records, &c., were destroyed. Sheds and stables, with their contents, were swept away. The glass propagating-house was knocked down, and all the plants therein covered by the flood to a considerable depth. The old bush-house was under water, a considerable portion carried away, the rest bent over, and the greater part of the plants destroyed. Fences were levelled with the ground or swept away. Huge trees were rooted out of the ground on the river bank and swept away, and several large clumps of bamboos were carried down the river. Several landslips occurred, several acres of land being carried away into the river. Over the whole lower portion of the gardens a thick deposit of mud and sand was placed. This varied from a few inches to upwards of 2 feet in thickness. All the lower walks were rendered impassable by this deposit, and it was nearly two months after the waters subsided before it was possible to walk on the slimy ooze deposited on the lawns and borders. On that portion of the Gardens where my residence stood, and on the Government Domain adjoining, large ponds were scooped out by the action of the water. The value of trees and vegetation in checking the destructive action of floods was well demonstrated in the Gardens, as well as in many other places on this occasion. The force of the current which swept across the point upon which the Gardens are situate was checked by the numbers of trees which it encountered, and a vast quantity of debris was entangled and detained. I am confident that if it were not for this filtering, as it were, to which the flood waters were subjected in their passage through the Gardens, a very much greater amount of damage would have been done in the lower portions of Alice and Edward streets, and in that vicinity. This protecting action of timber was

was also very noticeable at several points up the river, where houses having trees on the up-river side escaped, while others in the vicinity were washed away. In the Gardens also the refreshment kiosk, which was protected by trees on the exposed side, escaped, though situate in the course of the current, while much stronger buildings near, but without such protection, were destroyed. This points to the desirability of planting exposed points along the river with suitable trees, in order to mitigate the effects of future floods. The binding effects of buffalo grass (*Stenotaphrum Americanum*) was well illustrated. In many places round beds had been made in swards of this grass, and these beds were scooped out to a depth of two or three feet, while the ground covered by the grass remained uninjured, and in several instances the formation of gullies was stopped in this way, for as soon as the water began to wash away the earth upon which it grew, the buffalo grass hung down in a sort of curtain across the face of the forming gully, and prevented further erosion.

As regards the plants killed by these floods, it would be a tedious and useless waste of time to enumerate all the plants destroyed, but for the guidance of persons wishing to plant in positions subject to floods, I append lists of some of the principal and best-known plants which were killed (Appendix A), and which survived (Appendix B). In many instances one specimen of a plant perished and another of the same kind survived at no very great distance from each other. Clay subsoil, or deficient drainage, or both, contributed in no small degree to the death of many plants. An adequate system of drainage is every year becoming more essential here. I append map showing contour line of flood.

RESULTS OF THE FLOODS.—Prior to these floods the gardens were in first-rate order, and many valuable additions had been made to them during the past year; but, of course, the results of the whole work of the preceding period covered by this report were destroyed; but the net result will not be upon the whole so very bad. It will, of course, take a considerable time to efface the traces of the disaster, and there is much hard work to be done in replacing those collections destroyed; but the flood has effected some good in a wholesale and compulsory thinning out of many over-grown borders, crowded with specimens which had long outgrown their quarters. I feel certain that under favourable circumstances the Gardens will in a year or two resume that appearance of beauty for which they have been celebrated, and prove of even greater use than hitherto, as illustrating the immenso range of the vegetable products of every country in the temperate and tropical zones which can be grown in Queensland.

WORK DONE SINCE FLOODS.—After the first flood a number of men were put on to clear the walks as relief work. They were paid by the Colonial Secretary's Department. The amount of work performed by these men was not very great, and consisted chiefly in collecting débris and in clearing some of the main walks. Beyond this and an extra hand for about a month, I have received no extra assistance, and the arduous task of repairing damage has fallen upon the ordinary staff. The amount of work got through under these circumstances is surprising. Sheds have been replaced, the propagating house re-erected, the bush-house repaired, thousands of dead shrubs and trees cleared away, and a very large amount of general work done; so that the Gardens present a very different appearance now from what they did immediately after the floods. I have to express my thanks to the nurserymen of Brisbane and neighbourhood for their kindly and liberal offers of assistance in replacing lost collections.

EXCHANGE OF PLANTS, &c.—This has been continued as in past years, and many useful plants and novelties introduced. I regret that, owing to the destruction of notes and records by floods, I am unable, as in former years, to furnish you with particulars.

ARBOR DAY.—Notwithstanding that all our nursery stock was under flood, and a large portion destroyed, I was able to meet the demand for plants for Arbor Day. The number—700—of young trees sent out was distributed to sixty-nine schools.

I can spare young plants of the species named in Appendix E; indeed, I should be glad to get rid of them to make room for young stock; and, as every tree planted is a distinct gain to the colony, I would suggest that they be given away to *bonâ fide* selectors.

HORTICULTURAL CLASSES.—The horticultural classes commenced here two years ago have been continued during the past year with very gratifying results. The children continue to take the greatest interest in the classes, and it is gratifying to learn that these—the classes—have been the means of inducing not only children, but through them the parents, to take a much greater interest in their home gardens. One cannot help being struck with the generally neglected appearance of small cottage gardens in the vicinity of towns in Queensland, and, indeed, in the country as well; and when one remembers that in other countries no inconsiderable portion of the food of the people is drawn from small gardens in the vicinity of their dwellings, this neglect seems a bad augury for the success of what all well-wishers of the colony have so much at heart—*i.e.*, settlement on the land. These classes will, I am convinced, largely help to dispel this apathy, and are in fact doing so.

I am convinced that there is nothing more easy than to extend the benefits of this teaching to the whole colony through the medium of the schools. There are certain difficulties about the initiation of such classes, but I am certain that, if I were instructed to visit the principal schools of the colony, I should be able to successfully start a very large number of such classes, and to give the instructors such practical information as would enable them to carry them on successfully, and to awake in the children a spirit of inquiry into the laws which govern the operations of the garden. The development of such a spirit in the rising generation would, I think, go far to solve a question of the hour—the abandonment of the land for the unhealthy life of the city. During the Melbourne Exhibition of 1888, I was greatly struck with the splendid exhibit of the beautiful pictures, diagrams, models, &c., used in the day schools in France to teach the children gardening, which is there reckoned one of the most important parts of their education; and the readiness with which the people of that country take to the land and the great collective wealth of the soil-tillers are largely due to this system of education. This form of instruction has only recently been introduced into England, but has become in a short time so popular that it has been taken up all over the country.

My

My severe illness recently and the floods have led to the midsummer recess of the classes being a little longer than usual. On the 18th instant the classes again met for the fifth session, when the Hon. the Minister for Public Lands and Agriculture (Hon. A. H. Barlow) addressed the children. The classes consist of 100 girls and 100 boys. The former meet here on Thursday afternoons and the latter on Fridays. A plot of thirty square feet is given to each child, who is practically taught methods of cultivation, and given as good an idea as possible of the reasons for the various operations. At each lesson this session a short analysis of the lecture will be handed to each pupil, together with a number of questions to which he is expected to give answers at the following lesson. The following is a copy of the paper handed to each boy at the first lecture. These papers are printed here by the cyclostyle:—

“HORTICULTURAL CLASS.

“*Soils—Analysis of Lecture.*

- “1. How soils are first made.
- “2. Soils consist of—

(a) Water	} Proved by burning and sifting soils.
(b) Humus	
(c) Coarse sand	
(d) Fine sand	
(e) Clay	
- “3. Nitrogen in decayed vegetable matter.
- “4. Water, humus, oxide of iron, oxide of alumina, lime, magnesia, potash, soda, phosphoric acid, sulphuric acid, chlorine, carbonic acid, soluble silica, insoluble silicates, and sand, found in varying proportions in good soils.
- “5. Soils are, in varying proportions, permeable to water, absorbent of water, retentive of water, absorbent of gases, absorbent of heat.
- “6. Characters of soils—sand, clay, loam, peat, calcareous soil.
- “7. Necessity for stirring surface of soils; effects of mulch.

“QUESTIONS

“*To be answered on paper, and handed in next week.*

- “1. You have a heavy clay soil. How would you improve it?
- “2. How would you improve a light sandy soil?
- “3. What is the effect of stirring the surface of the soil?
- “4. In what positions is humus to be found naturally?
- “5. Why is farm-yard manure good for land?
- “6. Describe a good soil?

“PHILIP MACMAHON,
“Curator.”

The following is the syllabus of lessons for the current session. Each lesson lasts half-an-hour, and is followed by half-an-hour of practical work:—

“HORTICULTURAL CLASSES.

“*Syllabus of Lectures. Fifth Session, 1893.*

- | | | |
|---|--|--|
| 1—Preliminary allotment of plots.
2—Soils.
3—Laying out grounds.
4—Drainage.
5—Plant life.
6—Plants to grow.
7—Cultivation. | | 8—Propagating.
9—Planting.
10—Manuring.
11—Watering and irrigation.
12—Pruning.
13—Budding and grafting.
14—Plant classification.” |
|---|--|--|

REFRESHMENT KIOSK.—The refreshment kiosk, which was erected here two and a-half years ago, is not only an ornament, but has proved to be a very great convenience to the public. It has been conducted in a most admirable manner by Mr. and Mrs. Muling.

BUSH-HOUSE.—The large bush-house, built by me in March, 1890, has, though greatly exposed, withstood some severe storms, and being erected above flood level has not suffered. It has proved a source of pleasure and instruction to very large numbers. All the bush-houses require to be re-covered before the return of warm weather. This shall be done.

AVIARY.—The old aviary here is unfit for use as such, being cold and draughty. The Minister has approved of the conversion of the large conservatory (which is wholly unsuited for plant growth) into an aviary, and this will be carried out as soon as the great pressure of work on hand will admit. I shall be glad to receive any additions to this aviary, either as donations or in exchange for plants.

ASPHALTE WALKS.—It is now several years since the asphalt walks in the Gardens were laid down, a special sum having been voted for this purpose. I contrived out of the ordinary vote to have some repairs effected to them during the year; but, in consequence of floods and heavy rains, and from having stood so long, they are now in a bad state of repair; but with the funds at disposal it is impossible to properly overhaul them.

LABOUR AND STAFF.—I have made it a point to expend as large a proportion as possible of the vote at my disposal in labour, a much larger proportion indeed than is usual in such establishments. No changes of any moment have been found necessary in the *personnel* of the staff, the members of which have performed their duties diligently.

HORTICULTURAL INFORMATION.—I have answered personally a large number of inquiries on matters pertaining to horticulture, put by persons from all parts of the colony, and have generally endeavoured, within the lines laid down by the Department, to stimulate and help horticultural activity of every sort.

Cost.—

Government BOTANIC GARDENS BRISBANE

SCALE

Two Chains to One Inch



Red The Figures (thus 10f) indicates the depths of Flood Water in March 1890
On Feb 5th 1893 the Water stood 12f higher

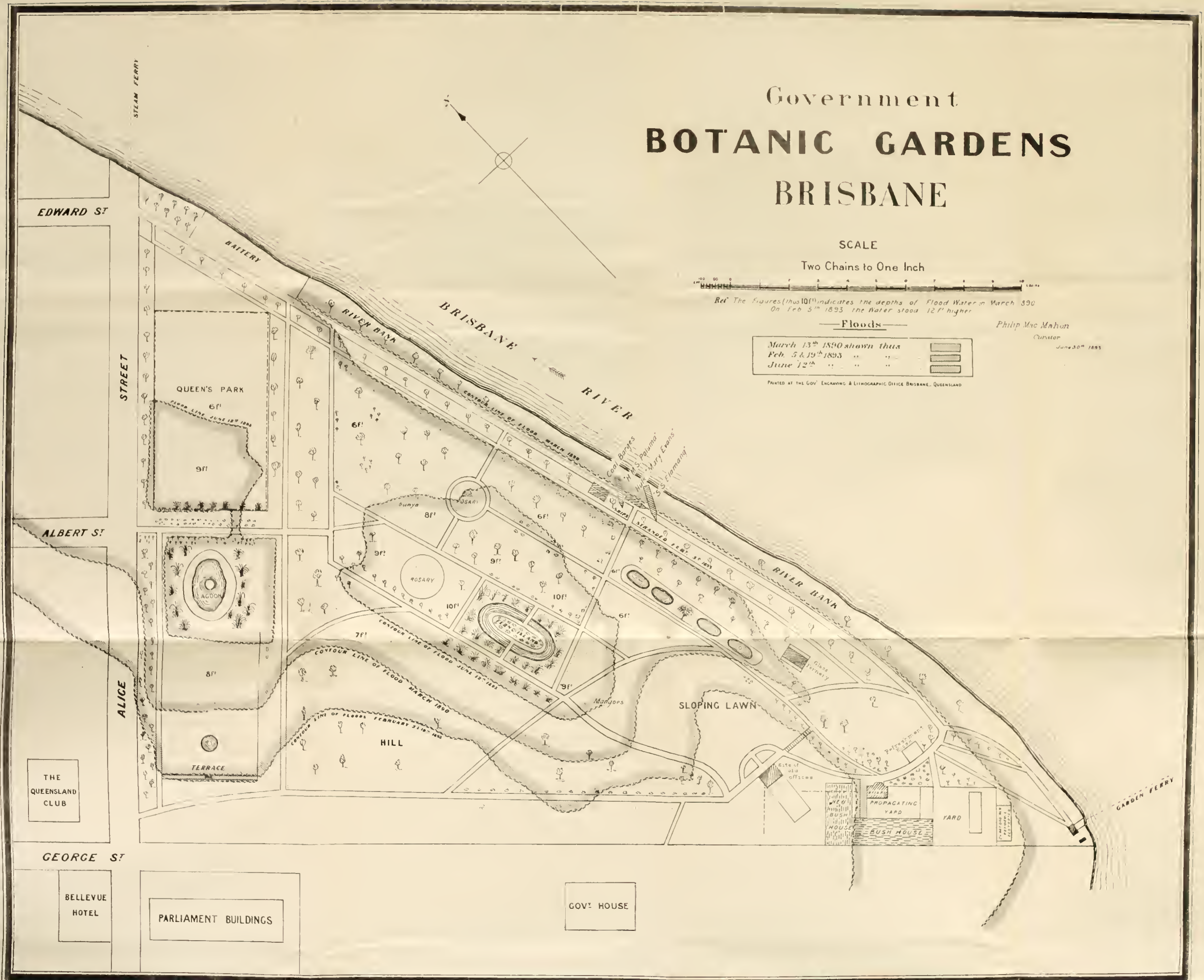
Floods

March 13th 1890 shown thus
Feb. 5 & 19th 1893
June 12th

Philip Mac Mahon
Curator

June 30th 1893

PRINTED AT THE GOV' ENGRAVING & LITHOGRAPHIC OFFICE BRISBANE, QUEENSLAND



COST.—A comparison of the yearly expenditure in connection with the principal Botanic Gardens in Australia, as extracted from official publications, will prove interesting. The following are the figures:—

					Cost.		Year.
Melbourne	...	...	...	...	£8,007	...	1892-93
Adelaide	...	...	...	...	6,439	...	1891-92
Sydney	...	...	...	...	6,325	...	1892-93
Brisbane	...	...	...	...	2,134	...	1892-93.

I have, &c.,

PHILIP MACMAHON,

Curator.

APPENDIX A.

LIST OF TREES AND PLANTS KILLED BY FLOODS, 5TH AND 19TH FEBRUARY, 1893.

(The figures, thus, 12ft., indicate depth of water around plants.)

- Abelia rupestris*.—Shrub. 12ft.
Aceronychia Baueri.
Alsophila Australis, *Alsophila Leichhardtiana*.—These noble tree-ferns were quite covered, and are apparently dead.
Arbutus unedo.—Irish Strawberry Tree. 15ft. Our only specimen.
Artocarpus integrifolia.—The Jack-fruit Tree. Of two fine specimens of this tree, which in former years fruited freely, one has been killed outright, and the other so severely injured that it will probably die. 20ft.
Baccharis halimifolia.—Groundsel Tree. 12ft.
Bambusa arundinacea, *Bambusa vulgaris*.—These escaped, though covered, or nearly so. *Bambusa nana*—A low shrub, also escaped, though covered by 20ft. of water. Many noble clumps of *Bambusa arundinacea*, on the river frontage, were washed away.
Bambusa tabacaria, *B. pubescens*.—These were killed. Stronger varieties escaped.
Beaumontia grandiflora.—Creeper. 20ft. Badly drained.
Berberis nepalensis.—15ft.
Buxus sempervirens.—Box Tree. 20ft.
Bracteolaria racemosa.—A most beautiful flowering tree. 20ft.
Brassia actinophylla.—Umbrella Tree.
Brunfelsia calycina.—20ft.
B. latifolia and other sps.
Calliandra pulcherrima.—Shrub. 12ft.
Calodendron capense.—Cape Chestnut. 15ft.
Chrysanthemums.—A large collection of new varieties recently imported from the South, and which had not yet flowered here, were covered by the floods and completely destroyed.
Citharexylum quadrangulare.—Fiddlewood, Jamaica. A fine specimen of this tree was killed.
Clerodendron Thompsonii.—20ft.
C. nutans.
Dahlias.—As might have been expected, these were all killed, including new varieties recently imported.
Datura cornigera.—Poisonous Trumpet Flower. 12ft.
Deutzia gracilis.—Shrub. 12ft.
Dombeya mollis.—Four or five plants of this perished under 22 feet of water, but one which had the advantage of proximity to a drain was not quite killed.
Duranta Plumeiri.—Hedge plant. 15ft.
Elaeocarpus grandis.—Quandong. A large tree of this has been dying since the 1890 flood, and in this flood a fine young tree was destroyed.
Entada scandens.—Match-box Bean. This creeper died back, but is growing again.
Eranthemum tenellum, *E. variabile*.—22ft.
Erythrina indica, *E. speciosa*.—Splendid specimens of these perished, whilst *E. cristigalli*, close at hand, was uninjured.
Eupatorium ianthinum.—Shrub 20ft.
Euphorbia pulcherrima.—Poinsettia. Lived under 6ft. of water, but perished under 10 to 20ft.
Euphorbia splendens.—A very fine specimen of this was killed, whilst the poisonous *Euphorbia Tirucalli* survived.
Ficus elastica.—The Indian Rubber Fig Tree of India; in 20ft. of water.
Ficus Pinkiana.—The only specimen in the Gardens. 22ft.
Ficus Roxburghii.—Though this fig has died back, it has broken out again, and will recover.
Graptophyllum illicifolium.—Tree. 20ft.
Holmskioldia sanguinea.—Some specimens of this shrub died, but owing to defective drainage, being in a low-lying position.
Ilex cornuta.—Chinese Holly and *I. aquifolium*—English Holly. 22ft.
Jacaranda mimosæfolia.—This beautiful tree does not seem to stand floods well. Several specimens perished, even those which were not deeply immersed.
Juanelloa parasitica.—12ft.
Juniperus.—All the species of this genus were killed.
Ligustrum japonicum.—The Japanese privet. 15ft.
Lonicera confusa.—Climber, gold and silver flower. 15ft.
Magnolia grandiflora.—A fine specimen of this noble plant succumbed, while, a few paces away, *M. glauca* escaped with only slight injury.
Melia azedarach.—Bread Tree or Neem Tree. 20ft.
Olea Europea.—Large trees survived, but smaller ones perished.
Oleanders.—These plants survived where the land was well drained, but perished where mud was deposited, and where the site was badly drained.
Pedilanthus

- Pedilanthus tithymaloides*.—Slipper Flower. Shrub.
Pereskia Bleo.—Killed where not very well drained. *P. aculeata* survived.
Philadelphus coronarius.—Mock Orange Shrub. 22ft.
Photinia serrulata.—
Pinus sinensis, *P. insignis*, *P. canariensis*.—These, as well as all exotic conifers, were killed, or so severely injured as to leave no hope of their recovery.
Pistacia terebinthus.—Turpentine Tree.
Pittosporum undulatum.—Shrub.
Plumeria acuminata.—Franchipanier. 20ft.
Quercus suber.—The Cork Tree. This was the only species of *Quercus* which perished, and this was probably owing to defective drainage rather than the direct action of the floods.
Rhynchospermum jasminoides.—Several magnificent specimens of this delightful creeper graced the Gardens. They shrivelled up at the touch of the flood waters.
Ricinus communis.—The Castor Oil Plant. This grows to a large shrub here. It was killed in every case.
Rondeletia speciosa.—20ft.
Roses.—A fine collection of over 600 varieties roses perished. A few only survived. These were Safrano, Marechal Niel, Rosa Persica, and Perfection de Montplaisier.
Russelia juncea.—Coral Plant. Low shrub. 20ft.
Schinus molle.—Peruvian "Pepper Tree." Killed by about 6ft.
Solanum.—All the species of this genus covered by flood were destroyed.
Spiraea prunifolia.—Dropwart. 12ft.
Stenocarpus sinnatus.—Tulip Tree. A beautiful Queensland tree. 20ft.
Saraca declinata, *S. indica*.—These successfully withstood about 20ft. of water, in an ill-drained situation.
Tarrietia actinophylla.—Tree.
Tecoma capense.—Creeper. Low position. 22ft.
Viburnum macrocephalum.—Wayfaring Tree.
V. opulus, *V. japonicum*.—20ft.
Vitex trifolia.—Indian Wild Pepper Shrub. 15ft.

APPENDIX B.

LIST OF TREES AND PLANTS WHICH SURVIVED FLOODS, 5TH AND 19TH FEBRUARY, 1893.

(The figures, thus, 10ft., indicate depth of water around plants.)

Acalypha.—Various species. Where the soil was sandy and the drainage good, these brilliant plants, though covered by water, did not lose a leaf, but are now more gorgeous than I have ever seen them. Where the above conditions did not obtain they died. They also died where the water stood at more than 8ft. or 10ft.

Agathis robusta.—Dundatha Pine. Specimens planted in low positions are uninjured.

Agave.—"American Aloes." Every species of the genus *Agave*, covered for ever so short a time by the flood waters, perished.

Allamanda Hendersonii, *A. nerifolia*, *A. nobilis*, *A. Schottii*, *A. violacea*.—These noble trailing plants died back, but have now quite recovered, and are covered with flower buds.

Alternanthera amabilis, *paronychioides*, *versicolor*.—These small plants, commonly called "edging plants," escaped the fate of all other plants ordinarily used in bedding out, such as *Pelargoniums*, *Geraniums*, &c. These all died, but the *Alternanthera* did not suffer in the least.

Azalea.—A border of fine *Azaleas* was covered to a depth of about 22ft., and the plants killed to the ground. On being cut down, and the ground cultivated, they show promise of recovery.

Bambusa arundinacea and *B. vulgaris*.—Do not appear to be injured seriously. They lost a great deal of foliage and looked sickly after the 1890 flood, and I anticipate similar results this time. Several fine clumps were lost by being swept into the river, with the ground upon which they stood.

Bauhinia acuminata, *B. Hookeri*, *B. purpurea*.—These trees stood well, except one specimen of *B. purpurea* in a low-lying place. A fine specimen of *B. corymbosa* (Scandens) is, I fear, quite dead.

Bixa orrelana, *Annato*.—Stood well.

Bougainvillea glabra.—This plant was only slightly injured. A large hedge of it in the Gardens acted as a most effectual protection to the plants on its sheltered side, sifting the water of sand and debris, hundreds of tons of sand being piled on one side of it, while none was deposited on the side opposite to that from which the current set. As this plant is of rapid growth, requires hardly any attention, and is moreover evergreen and showy, I would recommend that it be planted as hedges on the exposed sides of properties subject to floods. A double row of hardwood stakes might be driven in, and the plants set out by these at a distance of, say, 8 feet apart. An impenetrable hedge would soon be formed, which in flood time would prove a far greater protection than any solid structure.

Butea frondosa.—This magnificent flowering tree seems not at all injured, though covered by 20ft. of water, and in a badly drained place. After the flood of 1890 this tree flowered beautifully. A small plant of this also seems in greater vigour than before the floods, though greatly knocked about by floating timber.

Camellia.—Though all our plants were covered, in one case to a depth of 20ft., they do not appear to be injured except that the flowers are late.

Cinnamomum camphora.—The Camphor Laurel. This tree stood well, and I would recommend it for planting in places subject to periodic inundation, where, however, there is fairly good drainage at other times.

Coffea Arabica.—Coffee. Planted in a moist spot at the base of a hill, and covered by about 10ft. of water; does not appear to be injured. The berries, however (a good crop), are very slow in ripening.

Cordyline.—All species of this genus covered by floods have died back to the ground, but suckers may be procured for propagation.

Crotons.—A border of these plants was covered by 12ft. of water. They are not much injured.

Cycas.—All this genus stood well.

Dioon

Dioon edule.—Arrowroot Cycas. 8ft.

Ficus benjaminca.—Weeping Fig. This well-known and most beautiful tree has not been affected by flood, though young trees were in some instances quite covered. All species of *Ficus*, except *F. indica*, escaped.

Ficus nitida.—This beautiful Queensland tree is quite uninjured, though standing in a damp spot. I would recommend it for shade purposes in places subject to floods.

Ficus Roxburghii.—Killed back, but will recover.

Hæmatoxylon campeachianum.—Logwood. This tree was in some instances exposed to the full force of the flood, and even in damp positions held its own.

Hibiscus rosa-sinensis, *H. elatus*, *H. heterophyllus*, *H. syriacus*.—Seem little the worse.

Holmskioldia sanguinea.—In sandy places this handsome shrub is now flowering better than ever. 10ft.

Ilex Paraguayensis.—Paraguay Tea. A fine specimen. Seems little the worse for its immersion.

Kigelia pinnata.—Sausage Tree. This handsome tree, though nearly covered, escaped.

Lagerstræmia indica and other species.—None of these were injured, and as several of the species are very ornamental, they may be recommended for planting in gardens liable to flood.

Lagunaria Patersonii.—A splendid flowering shade-tree. Uninjured, though its roots were deeply covered with water, and a thick deposit of mud left around it.

Macrozamia.—All species survived. 8ft.

Mangifera indica.—A group of mangoes stood in about 15ft. of water, but were unhurt.

Murraya exotica.—Satinwood. This handsome shrub was unhurt.

Oleanders.—In sandy soil these escaped, though exposed to the full force of the flood.

Opuntia sps.—Of all the Cactus family, only the various species of *Opuntia* escaped. The Prickly Pear is a member of this genus.

Palms.—Though very many of these noble plants were completely covered by the flood waters, in no instance did a death occur, even in badly-drained positions.

Plumbago rosea and *P. Capensis*.—Lived in sandy soil, and nuder less than 10ft. of water; but under 20 ft. the latter perished.

Poinciana regia.—This well-known ornamental tree seems to stand the effects of flood better than the *Jacaranda*. Those in strong clay land died, but those in sandy soil survived.

Psidium guava.—Guava Tree. Survived well, deeply covered, and in damp site.

Punica granatum.—Pomegranate. This pretty shrub survived in every case.

Pyrus cydonia.—20ft.

Quercus sps.—Oaks. All species of Oak survived, except the Cork Oak (*Quercus suber*).

Randia Fitzalanii.—15ft.

Ravenala madagascariensis.—Travellers' Tree. 20ft.

Sequoia sempervirens, *S. Wellingtonia*.—In damp positions and deeply covered, survived.

Spathodea campanulata.—African Tulip Tree. Though in a bad position this beautiful tree was unhurt.

Sterculia acerifolia.—The beautiful Flame Tree, on a well-drained site, is uninjured.

Taxodium distichum.—Bald Cypress. Stood well. 20ft.

Wistaria sinensis.—Though this beautiful creeper was in the full current, and was covered with sand, it is unhurt.

APPENDIX E.

LIST of PLANTS for DISTRIBUTION (69 Species, about 4,500 Plants).

<i>Acacia Farnesiana</i>	<i>Ficus macrophylla</i> —Moreton Bay Fig
„ <i>horrida</i> —Doornboom Tree	„ <i>nitida</i>
<i>Andira encrnis</i>	<i>Grevillea robusta</i> —Silky Oak Tree
<i>Anona palustris</i> —Alligator Apple	<i>Hæmatoxylon campeachianum</i> —Logwood
<i>Araucaria Bidwilli</i> —bunya-bunya pine	<i>Hibiscus tiliaceus</i>
„ <i>Cunninghamii</i> —Moreton Bay pine	<i>Hymenoporum flavum</i>
„ „ var. <i>glauca</i>	<i>Jacaranda mimosaefolia</i>
„ <i>excelsa</i> —Norfolk Island Pine	<i>Kigelia pinnata</i> —Sausage Tree
<i>Bauhinia alba</i>	<i>Lagerstræmia Flos-Reginæ</i> —Jarool Tree
„ <i>purpurea</i>	„ <i>indica</i>
<i>Barklya syringifolia</i>	<i>Mæadamia ternifolia</i> —Queensland Nut
<i>Bixa orellana</i> —Arnatto	<i>Mangifera indica</i> —Mango
<i>Braetcolaria racemosa</i>	<i>Manihot</i> —Sweet Cassava
<i>Brassaia actinophylla</i> —Umbrella Tree	<i>Mesua ferrea</i> —Ironwood
<i>Castanosperrum australe</i> —Moreton Bay Chestnut	<i>Mimusops Elengi</i>
<i>Cedrela odorata</i> —Jamaica Cedar	<i>Morus nigra</i> —Mulberry
„ <i>Toona</i> —Red Cedar	<i>Myrospermum Pereiræ</i> —Balsam of Peru
<i>Cinnamomum camphora</i> —Camphor Laurel	<i>Pandanus spiralis</i>
<i>Cupressus pendula</i>	<i>Persea carolinensis</i>
<i>Dais cotinifolia</i>	<i>Photinea japonica</i> —Loquat
<i>Dillenia indica</i>	<i>Phytolacca disica</i>
<i>Diospyros</i> —Persimmon	<i>Pinus canariensis</i>
<i>Duranta Plumieri</i> —hedge plant	„ <i>insignis</i>
<i>Elæocarpus grandis</i> —Quandong	<i>Plumeria acuminata</i> —Franchipancier or Pagoda Tree
<i>Endiandra virens</i>	<i>Podocarpus elata</i> —She Pine
<i>Erythrina ovalifolia</i>	<i>Psidium eattleyanum</i> —Cherry Guava
<i>Erythrina speciosa</i> —Coral Tree	<i>Putranjiva Roxburghii</i>
<i>Eugenia jambos</i> —Rose Apple	<i>Quercus pedunculata</i> —British Oak
„ (sp.)	<i>Schinus terebinthifolia</i>
„ <i>uniflora</i> —Brazilian Cherry	<i>Schotia latifolia</i>
<i>Excæcaria sebifera</i> —Chinese Tallow Tree	<i>Stenocarpus sinnatus</i> —Tulip Flower
<i>Ficus Benjaminca</i> —Weeping Fig	<i>Sterculia acerifolia</i> —Flame Tree
„ <i>carica</i> —Cultivated Fig, edible	<i>Tamarix indica</i> —Tamarind
„ <i>Cunninghamii</i>	<i>Willmetia capensis</i> —Hedge plant.
„ <i>gracilipis</i>	

ANNUAL REPORT OF THE OVERSEER, STATE NURSERY, MACKAY.

30th May, 1893.

SIR,—In presenting my fourth Annual Report of the State Nursery under my charge, I am sorry to admit that the extreme drought has again militated against many things that would have shown different results under a heavier fall of rain, or under an efficient system of irrigation, and it gives me a great amount of relief to know that the long-spoken-of water supply will now be carried out, which, when in working order, will warrant the introduction of some of the plants that were lost through want of moisture while in a young state, to apply which with the amount of labour at command was simply impossible.

MANGOES.—A very important matter will, as soon as the irrigation work is complete, be got on with—viz., the propagation of the Indian mangoes. The stocks for inarching these upon are all contained in tins and boxes so that they can be placed round the growing trees; these tins and boxes, which have to be watered every day to keep up the flow of sap necessary to the success of the inarch, to carry the amount required, would have entailed more labour than could have been given, but the water can then be run close to where required. The imported plants have grown well, most of them being now good-sized trees, and will, I expect, fruit this season.

SUGAR-CANE.—Considering the want of rain, the five varieties from Mauritius have grown well, and about eighteen tons of plants have been sent out, the reports of which show that they have done remarkably well; the greatest demand being for Rose Bamboo, Striped Bamboo, and Louziera. There are a large amount of Louziera, Bronchen Royee, and Bronchen Blanche left.

SEEDLING SUGAR-CANE.—The seedling received from New England, I have named *Kewensis*, and should it contain the elements of survival, the name will be an indication whence it was received. It made but moderate growth, but by cutting it up into single eyes and placing in the propagating-house I managed to send out twelve growing plants to each of the following plantations:—Colonial Sugar Refinery Company, Homebush (Mr. McLean); Melbourne-Mackay Sugar Company, The Palms (Mr. Davidson); Te Kowai Plantation (Mr. Pope); Habana Plantation (Messrs. Long and Robinson); Ninderoo Plantation (Messrs. Paget Bros.); and State Nursery, Kamerunga (Mr. Cowley); and have fifty remaining for planting out here. I think all these plantations have got scrub land to plant it in, which will prove whether or not it will grow a crop that will induce further trial. There may not be enough grown to crush, but the chemist will be able to determine what amount of sugar it contains; so as far as tasting goes, I think it the sweetest that has come under my notice.

RICE.—The eleven varieties rice received, the native names of which are Bog Chaplu, Koya Joha, Koli Chaplu, Ahn Joha, Showlei, Moni gotha, Nilegi, Bong anguta, Kolajurih, Shiraka ahom, Betguli, were sown on the 19th and 20th of December last. The first to show ear was Koli Chaplu, but the first to ripen was Bog Chaplu, which was cut on the 6th of April, and between the 6th and the 15th all were cut and thrashed. All the seeds, with the exception of Koya Joha, were bad. It came up a full crop, and was reaped at the rate of 11 cwt. 1 qr. 3 lb.—not quite half a crop; but the land upon which they were grown is a miserable, poor, hungry piece on the top of the bank of the lagoons, from which the rain runs readily away; the subsoil, an open gritty sand, holding no moisture, conditions that rendered a good crop impossible. All the sorts have ratooned; the ratoons of the first cut (on the 6th of April) were in full ear on the 1st of May, but not more than 1 foot high—the result of poverty and want of moisture; but it is evident that on good land a seed and ratoon crop may be harvested in about 140 or 150 days.

GRAPES.—Several sorts of these have borne well. The early sorts, such as Sweetwater, Royal Ascot, White Solferina, ripened well, but the later varieties—namely, Black Spanish, Le Noir, New Isabella, Espar. Iona, Green Dalmanes, Alicante, shrivelled after “stoning,” and did not ripen well, which would not have been the case had water been supplied; indeed, fine weather and irrigation are evidently the conditions most favourable to healthy vines and a good crop of grapes here, for nearly all the sorts are subject to *anthracnose*, which, however, makes its appearance only in wet weather. When the rain has ceased, a few days' sunshine again starts them into healthy growth. I have added twenty-one varieties to the original thirteen, but as all these were last season's cuttings, which, owing to the extreme drought, made little progress, there will be no fruit on them this season. As an experiment, I sent cuttings of White Solferina to Mr. Thomson, gardener at Drumlauld Castle, Scotland, several of which grew with him. At the same time I asked him to send me cuttings of two sorts I wanted—viz., Foster's seedling and Muscat of Alexandria. From some hitch in postal arrangements they were nearly three months on the voyage. The nine cuttings of Foster's seedling have all grown, and four of the Muscats, proving that grape-vine cuttings will retain their vitality for a long time under circumstances not at all favourable—shut in a box in the hot hold of a steamship.

ARROWROOT.—Arrowroot (*Maranta arundinacea*) received from Kew has again grown a great crop, and as soon as ripe there will be a large quantity for distribution.

TURMERIC.—Turmeric (*Curcuma longa*) has grown well again, a large quantity of which will be available for distribution.

WHEAT, OATS, AND RYE.—The oats and rye grew well for a while, but were ultimately entirely destroyed by rust, a small amount of the wheat escaping the same fell disease.

SWEDES.—The swedes grew again a fine crop of heavy bulbs.

MANGOLDS.—The mangoldwurzel seed was bad; not more than twenty plants came up.

SISAL HEMP.—The plant sent as *Agave rigida*, var. *sisalana*, has grown a strong plant, producing a large number of suckers; but it is not the right kind. I believe, however, that the last consignment is correct, and have now taken ground, and will soon grow into strong plants.

ANNATTO.—Annatto (*Bixa Orellana*.) Notwithstanding the drought, these plants have grown well, are now bushes 10 feet through, and now covered with flowers.

MULBERRIES.—

MULBERRIES.—*Morus nigra* (varieties) have also grown into large bushes 15 feet high, and as much through, but, unfortunately, they are all the wrong sort. They were sent for *Morus alba*, and it seems to me very desirable that *Alba* should be introduced, as we could then give in a small way the silk-worm a trial; and as it is reported that it can also be fed on the *Ramie*, and produce a very fine silk, the half-acre I have got growing would produce food for a considerable batch of worms.

TAMARINDS.—*Tamarindus Indica* have grown well, and several of them are bearing pods; and I can see that some of them are much more precocious in flowering than others. Some also bear pods containing much more pulp than others. When that bearing the best pods has been ascertained, it will then be increased by grafting.

PEACHES.—Seeing how people buy and use the seedling crabs that are grown, I infer that the peach will be greatly appreciated here. It bears abundantly; and although I know the moth takes the best first, I think that difficulty may to some extent be got over. Believing in the peach induced me to start raising seedlings, and I am glad to say that I have already got one, a very fair fruit, and although not equal to such as Royal George or Noblesse it is a great improvement on any I have seen growing in the neighbourhood. It would seem that seedlings raised in the colony bear better than the first-class English varieties—at least, such is the opinion of some, but I have not had time yet to prove either way. I know that the raising of new and better sorts of fruit from seed is generally a long and discouraging work; an improvement may be obtained in a first batch, but it is more likely to be the work of a lifetime.

PAPAW (*Carica Papaya*).—The new variety of this fruit is certainly an improvement in some respects; the plant branches and grows more into a bush, and is a great bearer. Some think the flavour better and some think it no improvement, but I think this difference of opinion may arise from the fact that some have tasted being riper than others. Its chief recommendation, in my opinion, is the hardness of its skin. If cut just when turning colour, it might be exported to any of the Australian colonies.

MANURES.—None of the artificial manures sent up have proved of any use whatever. They have been tried in a great many ways and times, and on various crops, but no advantage seen.

IMPROVEMENTS WANTED.—I still greatly feel the want of a small place as a seedroom and office combined. I have the greatest difficulty in keeping seeds even for a few months, and shall be very glad when £12—the amount required for a small lean-to against the north gable of the kitchen—is authorised.

I have had a large number of requests for horticultural information, which I have generally been able to give.

Attached are lists of the plants of economic value growing in the Nursery, and also of the distributions during the past year.

I have, &c.,

D. BUCHANAN.

LIST OF FRUITS, ROOTS, GRAINS, AND PLANTS OF ECONOMICAL INTEREST GROWING IN THE NURSERY.

Fruits.

Bahia Oranges
Indian Oranges—3 sorts, Cintra, Mozambique, and Ladoo
Japanese Oranges—*Citrus trifoliata*
Lemons—*Citrus Limonum*
Vi Apple—*Spondias dulcis*
Persimmons—*Diospyros kaki*, several varieties, four of which have borne fruit, very fine
Pines—Ananassa, 6 sorts, Queen, Cayenne, Reine Pomare, Brown Sugar-loaf, Trinidad, and Black Antique
Grape Vines—in all 34 varieties
Japanese Plums—11 unnamed and several named sorts

Lechee—*Nephelium Litchi*, 3 sorts, No Mai Chee, Varhak
Yep, Hung Lee
Chinese Plums (an Apricot)—Hung Sum Lee
Musa—Plantains, 6 unnamed sorts, and Cavandishii
Indian Mangoes—18 sorts as follows:—Kistapal chotta, Khahaurecah, Kachelace, Goa, Bangalore, Fuzree, Ferogabonnee, Bahandoorea, Kista palburra, Bengal No. 2, Arbutnot, Gopal Bhog, Chuckukeca, Alphonso, Madam, Dalhugny, Langer, Madras
Bael-tree—*Egle marmelos*
Figs—Brown Turkey, and one from India unnamed

Plants of economic and commercial interest.

Para and Cerra Ruber
Arnatto—*Bixa orellana*
Ramie—*Bœhmeria nivea*
Coffee
Tea
Indigo
Dolichos lablab
Dolichos uniflorus
Cajanus indicus
Sun Hemp—*Crotalaria juncea*
White Field Peas
Golden Amber Cane (sorghum)
Sweet Potatoes—2 sorts, not tested yet
Sugar Cane from Mauritius, 5 sorts—viz., Striped Bamboo, Rose Bamboo, Louzier, Bronchen, Blanche, and Bronchen royce; one kind from Fiji

Jute—*Corchorus capsularis* and *Olitorius*
Teal Oil—*Sesamum indicum*
Teosinte
American Corn—6 sorts
Flax—*Linum usitatissimum*
Arrowroot—*Maranta arundinacea*
Sisal Hemp—*Agave sisalana*
Candle-nut—*Alcurites moluccana*
Yams—*Dioscorea*. Several sorts unnamed
Divi Divi—*Cœsalpinia coriaria*
Flacourtia ramontchi
Walnuts—*Juglans regia*
Pithecolobium saman

LIST OF PLANTS AND SEEDS FOR DISTRIBUTION.

Bahia Oranges
Japanese Oranges
Indian Oranges
Ramie
Grape-vine Cuttings (16 sorts named)
Seedling Mangoes

Tamarinds
Seedling Oranges
Sugar-cane (5 sorts)
Indian Figs
Turmeric Rhizoms
Arrowroot Rhizoms

Seeds.

Cajanus Indicus
American Maize (6 sorts)
Tobacco (14 sorts)
Corchorus Capsularis—Jute
Corchorus Olitorius—Oil
Sesamum Indicum

Voandzeia Subterranea
Dolichos Uniflora
Dolichos Lablab
Harico Beans
Teosinte

WEATHER

WEATHER REPORT for 1892 at the STATE NURSERY, MACKAY.

Month.					TEMPERATURE.				RAINFALL.		
					Mean Maximum.	Mean Minimum.	Extreme Heat.	Extreme Cold.	Number of Wet Days.	Total Fall for the Month.	Total Fall for the Year.
January, 1892	91·03	68·25	95·0	62·0	12	Inches. 11·10	} 53·24
February	...	...	...	...	86·02	67·26	91·0	63·0	7	2·44
March	...	...	...	...	89·06	68·23	95·0	66·0	9	4·04½
April	...	...	...	...	85·06	59·09	95·0	45·0	6	3·06½
May	...	...	...	...	77·21	58·21	89·0	45·0	15	6·70
June	...	...	...	...	77·14	51·26	85·0	40·0	7	3·65½
July	...	...	...	...	73·02	50·05	77·0	37·0	6	1·84½
August	...	...	...	...	78·20	49·07	86·0	45·0	2	0·21
September	...	...	...	...	83·09	57·01	89·0	47·0	11	9·26½
October	...	...	...	...	84·10	63·07	87·0	54·0	8	7·77
November	...	...	...	...	86·02	62·18	93·0	57·0	4	0·39½
December	...	...	...	...	92·14	69·77	99·0	64·0	7	2·75

Summary of seeds and plants distributed by State Nursery, Mackay, between 8th June, 1892, and 26th April, 1893 :—Annato, 1 ; arrowroot, 1 ; chicory, 1 ; coffee, 4 ; Eugenia, 1 ; field peas, 19 ; Flacourtia eataphracta, 1 ; granadilla, 4 ; grape, 12 ; Indian fig, 3 ; Japanese plum, 4 ; maize, 16 ; mango, 5 ; mulberry, 1, New Guinea nut, 1 ; new papaw, 35 ; orange—Bahia 6, Indian 1, Japanese 1, seedling 6 ; passion fruit, 1 ; peach, 3 ; plantain, 1 ; sugar-cane, 35 ; sweet corn, 2 ; sweet potatoes, 4 ; tamarind, 1 ; tea, 2 ; tobacco, 6 ; tomato, 2 ; watermelon, 4 ; wheat, 1 ; yams, 4 ; total, 189.

THE ANNUAL REPORT OF THE OVERSEER, KAMERUNGA STATE NURSERY.

SIR,—I have the honour to submit the following report, which, as it has to be made preparatory to my leaving, under your instructions, for British New Guinea, extends over a period of eleven months only.

The total rainfall for this time was 46·832 inches, which is less than half the usual annual rainfall ; other peculiarities of our climate are in evidence in the weather report, which is annexed, under Schedule A. The extremes of heat and cold have been very great.

Notwithstanding the paucity of the rainfall, however, the winter of last year was not particularly dry, rain falling during each month, September and August being the driest. The thermometers reached a maximum of 102·5 degrees in the shade, and descended to a minimum of 62·8 degrees during January of this year—a range of 39·7 degrees. This was exceptionally trying weather for all ; the few cold nights served somewhat as revivers for the great heat of the day.

PERMANENT IMPROVEMENTS.—Under this heading comes the construction of a hardwood post bush-house, which has been built by our own labour. A causeway over the gully has been made with stones collected from the surface of various fields. A potting-shed has been attached at the end of the stables ; this also was completed by ourselves.

A commencement has been made to harden the Nursery roads and paths with stone-breaker refuse, a large quantity of which is to be obtained at Kamerunga Township. A culvert made of old sawn railway sleepers has been built over the gully at intersections of Fields Nos. 1 and 2 of Sections Nos. 1 and 2. A small paddock, to include stable buildings in its area, has been completed, the posts being obtained from old railway works at Kamerunga. The whole has been covered with wire and wire netting, and the paddock serves as feeding-ground for the horse at short intervals. Breadfruit and mango trees have been planted by roadsides, the former on the lowest ground in the Nursery.

Beyond measuring the distances from a site on the Barron River, and furnishing you with plans of same, nothing has been done in regard to water supply.

Stumping Field No. 2 of Section No. 2 has been commenced, and will be continued and finished during the present year. Another field only will be stumped—viz., No. 2 of Section No. 3. This will complete the stumping advisable in the present nursery enclosure, as the other fields are on an incline, and it would hardly be advisable to remove the stumps from them on account of the rush of water during very heavy rains. The undergrowth of these fields has been cut down, and maize planted on portions.

NEW INTRODUCTIONS DURING THE PERIOD.—A ease of *Artocarpus incisa* (breadfruit) was received from the Curator, Botanic Reserve, Suva, Fiji, in September, 1892. These plants were at first planted in the bush-house, and 19 have since been transplanted to permanent places at the bottom of Field 1 of Sections 1 and 2. (A few only have been distributed.) These plants at time of writing are looking very promising. There can be no question about the value of this introduction, both for the white and black population. The Fijian variety is a good one, but a better possibly might be obtained from the Society Islands. The New Guinea variety is not worthy of introduction. The missionaries there are introducing the South Sea Island varieties. The mode of obtaining this tree is from root-growth, the young plants springing from the surface roots. These parent roots are slow in sending smaller roots of their own, but retain vitality for a long time. Fifty per cent. will eventually grow with care. It will only be work of time and patience, when the whole of our coast gardens will contain specimens of this delightful and valuable tree from the ones introduced here—*Manihot Glaziovii*, *Oeara rubber*. Notwithstanding that the seeds of this tree were in the ground for over twelve months, only five eventually germinated ; two of these have been planted in the open ; it appears to be a rapid grower, and hardy, having attained a height already of 4 feet 6 inches with a corresponding robustness of stem. This being a strictly tropical tree, it is quite probable that good results will follow its introduction into this Nursery.

RUBBER FIGUS.—Some cuttings, three of which have grown, have been received from New Guinea. This may probably be *Ficus elastica* of Roxburgh, and probably only a quarter only—of these cuttings grew. Specimens of this plant will be forwarded to the Colonial Botanist for determination when the plants have made sufficient growth in the bush-house awaiting development and a suitable time for transplanting.

A small quantity of **BROOM MILLET** (*Sorghum dura*) was very kindly sent by Messrs. Brown, and Co., of Townsville. The first planting of this seed, after favourable sowing, was destroyed by a spasmodic swarm of caterpillars. The second planting (December) thrived well to a height of 14 feet. After the seed panicles appeared they were somewhat discoloured by rust, but a small quantity of seed has been obtained and is available for distribution. Other patches have been planted and look promising, so there will be abundance of seed later on for all who desire to grow it. Two fair panicles of seed were forwarded for your inspection.

KAFFIR CORN.—This plant is known to me as "Mabele," the Zulu name for it. The seed received from you was fertile, and an abundant crop of grain has been reaped, and is available for distribution. All animals are exceedingly fond of it. Horses seem to prefer it to anything. They devour the panicles in lump and chew the harder stalks after eating all the leaves. As it ratoons rapidly, there is hardly a better farmer's crop for green fodder purposes.

MUSA (Banana Family).—Through the courtesy of Mr. D. Patience, of Messrs. Burns, Philp, and Co., Cairns, the Nursery is in receipt of eight specimens of Java bananas, all of which are growing well. The varieties are Pissang Radja Serch, Pissang Tanvek, and Radja Ajawa. There is probably one other variety amongst them, but the labels had been removed. This is a valuable addition to the Nursery. From Central British New Guinea the varieties Bigu, Dau, Deiuri, Aiva, Karua, Sis Komu, Konoboro, Garokone were obtained, and twenty-one other varieties from Mabudauan, the most western station of the Government of British New Guinea. All have been, and successfully, established in the open. The Mabudauan varieties have no Papuan names attached; an effort will be made to obtain these, if possible, from Mr. Lawes, who kindly supplied the names of the specimens obtained in the Central District. No meanings could be given, and it is probable they convey none, or that it is very obscure even to the Papuans themselves. The Nursery now contains a valuable and extensive collection of the Banana family.

CITRUS FAMILY.—The following varieties of oranges have been added to our collection:—Chinese, subacid, large sweet, seedless, chrysanthemum, and Bahia navel. All except the last are doing well, which seems to have been grafted on to weak-growing stocks and are feeble; the other varieties are on dwarf or *Citrus trifoliata* stocks, and are vigorous, although dwarfed.

ROSELLA (*Hibiscus sabdarifa*).—A new form of this hibiscus was received from the Curator, Rockhampton Botanic Gardens. Unfortunately, this plant has been very much pestered with a most persistent small leaf-eating red-headed beetle, specimens of which have been forwarded to you for possible identification. Weak solutions of Inibbles' compound serves to drive them away for a short time only. A stronger solution kills both pest and plant. The plant has not yet essayed to bloom, and I despair of getting even enough seed for preservation of the variety.

THEOBROMA CACAO.—A wardian case of Cacao beans was received from Ceylon during December. All or nearly all had germinated in transit, and most of them perished. All were given a chance in the bush-house, but only twenty spindly plants survived. These are doing fairly well, and will be planted in the open next wet season. This is certainly a start with what should become in tropical Queensland a very important branch of agriculture. To simplify transit, I would recommend that the beans should be placed in a bed of cocoanut fibre refuse in bamboo cases about 2 inches in diameter and 10 inches long. A large number of them could be packed on end in a medium-sized wardian case with a lofty roof. Should the beans then germinate in transit they would have roothold in the cocoanut refuse, and room to grow above. The bamboo cases could be held in position in the usual way.

AGAVE RIGIDA, VAR. SISALANA.—Thirty specimens of this fibre-plant have been successfully established in Field No. 3 of Section No. 1. They are at present looking very promising.

DIOSCOREA (Yams).—At least two new varieties of yams have been received from the islands in the neighbourhood of British New Guinea. These have not, I think, been yet botanically described, but as one variety is a white form the other red from the Trobriand Islands, I have called them Trobriand white and Trobriand red. It is a very excellent yam, and much prized by seafaring men in that part, weighing up to 12 lb., clean skin, good (oval) shape, and keeps admirably; it is also very good eating. A considerable quantity of the above varieties will probably be available for distribution later on in this year. At present they are looking very promising.

The **POTATO YAM**, so called by traders and others in East British New Guinea, seems quite a new variety. Unfortunately only one tuber was obtained from the Trobriand Islands, of which the form of the leaf is cordate, almost round, prominently nerved. The petiole is from 2 to 3 inches long, and thorny, and resembles the Panna yam somewhat in this regard; the stems are purple; but only one tuber having been observed, but little further can be said regarding it. The stem is roundish, and very unlike the red and white Trobriand varieties, which have quadrangular stems with cordate lanceolate leaves and no spines. It will be some time before any of this variety (the potato yam) can be spared out of the Nursery, unless a further supply from the east end of British New Guinea can be obtained. Another edible tuberous root from Darnley Island, Queensland, was obtained, a growing specimen of which has been forwarded to the Colonial Botanist for identification. It is probably new, and forms a considerable food for the Darnley Island natives. Two forms of sweet potato have been obtained from Dalrymple Island, Queensland. This seems a new variety; the tubers are not large, but superior eating—one is a white, the other dull pink. This potato is very roughly cultivated by the islanders on this low, sandy island; but that the tubers are esteemed is evinced by pearling and other boats calling there to get a supply.

one unknown to me was obtained from Thursday Island. This seemed a growing well in Field No. 1 of Section No. 3, and will be there observed

Sugar-cane have been obtained from British New Guinea, but as borer varieties all were subjected to what proved a too severe fumigation with frequently, plants and pests both perished. As I am under your instructions British New Guinea, duplicates of these and other varieties will be collected, if possible, of borer.

COLOCASIA ESCULENTA (Taro).—This valuable food root has been introduced from various parts of British New Guinea, and is doing well in the open. This vegetable is one of the favourites of the South Sea Islanders, and few gardens in those islands are without it in some of its many forms. The varieties we have are from the Eastern, Central, and Western divisions of British New Guinea, and vary in colour, appearance, and, probably, flavour. Not only is the root good eating, but the stalks boiled form a fair substitute for asparagus and the leaves a good spinach. It should be stated that the leaves of this *Colocasia* should never be put in the mouth in a raw state; it is very acrid and causes severe pain when unboiled. South Sea Islanders who have visited the Nursery since it has been introduced were remarkably pleased on recognising it. This plant will very soon extend, so that distribution can then be made.

ELEIS GUINEENSIS (Oil Palm).—During the past eleven months these palms have thriven very well—indeed, and promise well for North Queensland. The eight established palms are robust and vigorous, and will doubtless be the nucleus of future large Oil Palm groves.

COFFEA (Coffee).—A small grove of nineteen trees of the Arabian variety may be said to have come to full bearing in three years. The seed was planted in May, 1890, and at the time of writing these specimens are loaded with nearly ripe fruit. At a low estimate there will probably be 4 lb. of coffee in pulp on each tree; the berries are ripening at a nice time of the year, and the fruit is comparatively regular. There appears to me to be two forms of this variety, one yielding somewhat smaller fruit. The stem is blackish, the fruit-stalk droops or curves inward, spadix medium sized, fruit round, 4 to 6 inches long, terminating abruptly at the apex, skin thin, fruit somewhat apple-flavoured, dry and pleasant. Sossido variety has a green stem; petioles, leaves, and sheathing bases covered with white tomentum. Fruit spadix small, not drooping; fruit small, angular, pointed; an indifferent fruit. Gida variety has not fruited, and no description can be given of this variety. Plants of the Barrego and Sossido varieties are available for distribution. As no disease has developed, and only one tree died out of the twenty from some unknown cause, it is only fair to come to the conclusion that coffee planting may be encouraged among the smaller farmers with every confidence. Of course this earlier maturing of the tree may mean a short life, and planters should be cautious and not plant too much in any one year, but after, say, the first two acres, plant yearly a smaller area. I see no reason why very many comfortable homes and independencies cannot be formed by persons who are desirous to become coffee-planters.

A larger area on Field No. 3 of Section No. 2 has been growing well during the year. This patch is fringed with *Coffea Liberia*, which variety does not appear to me to be adapted to our climate; but, of course, nothing positive can be reported until the trees are further advanced, except that the Arabian variety planted within the ring of *Liberia* has progressed a great deal more in its growth through being of the same age as the *Liberian* Coffee.

CITRUS FAMILY (Oranges).—The Palestine or Jaffa orange has fruited. It is to me a decided disappointment, having no real orange flavour. A cluster of fruit was sent to you for taste and observation. The tree retains its ungainly habit. All grafting was from scions off this tree.

The Seville has not fruited; it is a robust grower, and in its earlier stages was attacked by a peculiar leaf disease, which has now disappeared.

Mozambique, the one variety from India.—The Mozambique is also flourishing, but has not flowered.

Myrtle-leaved Mandarin from Malta has fruited. Weight of fruit, 5½ oz.; true Mandarin shape, with a thin rind. This is a very handsome rather small tree, and is an abundant bearer. It is suitable for ornament, as well as valuable for its fruit. The South African Sweet Lemon is flourishing, but is not advanced enough to bear yet.

Maltese Sweet Orange.—This is a sweet orange, without a taste of acid. It is an abundant fruiter, does not cluster, is a handsome rather shapely small tree.

Maltese Egg Orange.—This came labelled "Blood Orange," but, as it is of an oval shape and clear juice, it is probable will be in season in May and June. These two months are our very early winter, and usually there is plenty of good picking weather.

MUSA FAMILY (Banana).—Of the three varieties originally obtained from Central British New Guinea, the Barrego variety is the best for fruiting. The Egg variety:—Weight of fruit, 8½ oz.; yellowish pulp, with plenty of nice-flavoured juice; thickness of rind, $\frac{3}{16}$ of an inch. The tree is flourishing.

COW-PEA.—Considerable quantities of this Legume have been cultivated for seed and distributed. There is a quantity on hand for present distribution. The varieties are Whip-Poor-Will and clay-coloured. These do not appear to vary in habit or in time of maturing. Summer months are best for this three-month crop. The shell of the Legume, when ripe, is very delicate, and during wet weather the beans inside soon discolour, and a considerable number perish. For a green manure crop this, of course, does not matter.

Temperate Zone Vegetables continue from April until the end of August. It is quite useless to attempt the growth of French beans, cabbages, Kohl rabi, peas, and other vegetables before April; even that month is early. Cabbage plants may be grown in a bush-house, to provide for planting out in May or June. Their growth then is rapid, and excellent results follow, as was proved last year. English potatoes should be planted not later than May; fair results are obtained when planted during this month, but later planting renders the crop mostly black-hearted and useless; 136 lb. of English potatoes planted

produced 448 lb. in September; 28 lb. planted later in the former patch was treated with kainit, the latter with pig manure, but no true rust was observed. Mulching with rice straw made no difference; all appear to be only worthy of cultivation for home and garden use. The flea beetle, although present, was not so prevalent as during the last season.

PRINCESS SOPHIE.—A fair crop was reaped on the 26th of March, from an area of 1,518 superficial feet, 27½ lb. of good peas per acre of dried peas. The plot had no manure, occupying the same space as the one which have been distributed; retaining a quantity for this year's planting.

WHEAT.—Experiments with this cereal were not on a large scale, but produced to render more extensive experiments this year possible. Smut was present, but no true rust was observed. It is probable that in certain seasons, when favourable weather prevails, a fair crop may be reaped. The varieties experimented with were Baart, Australian Obedience, Ward's Prolific, Egyptian Early Para, and Behan Nos. 1 and 2.

RICES.—All the Indian varieties you sent me in October failed to germinate. We have in Field 1 of Sections Nos. 2 and 3, patches of Chinese Hill, Saigon, and Jung Mura. The well-known miller, Mr. Harper, paid a visit to the Nursery after last season's crop had been harvested. I submitted samples of the grain to this gentleman as an expert. He at once chose the Saigon and Chinese Hill as the best varieties for milling purposes, as they contain more grain flint than the Jung Mura and other varieties, which he classed as starch rices, and wore away with husking. Quantities of various kinds have been distributed over the colony. It may be noted that the flea beetle, mentioned in my last report as an enemy to the young rice in its very early stages, appeared again directly the young rice of this season sprang out of the ground, and quite ruined the plots; another planting was made in March. As considerable rains fell during that month, this rice is coming on fairly well, having escaped the insect pest, which the rain has seemed to disperse or destroyed. Nothing regarding the life history of this rice pest has been discovered. More rice will be available for distribution, which should be made in October, so that planting can be done in November and December, which, under normal conditions, are the proper months for planting.

LATHYRUS SYLVESTRIS.—This fodder plant has again failed, notwithstanding that the seed was reported to be correct *Lathyrus*. It grew for a short time, only to die out altogether eventually. It was given a fair chance in a patch near the house, and considerable attention was bestowed upon it; but it is evidently not suited to our climate, at least to this hot portion of it.

PANICUM TENERIFFE, VAR. ROSEA (sometimes called Natal Red Grass).—This is an excellent fodder grass for this part of Queensland. A small patch only was planted near the house. This has provided a great quantity of seed, and has been distributed all over the colony. It stands dry weather, bears abundant leaf, and may be cut four or five times during the year. Persons desirous of this seed may have it fresh on application almost at any time of the year.

PANICUM MAXIMUM.—Guinea grass. This grass has spread all over this district, and has become thoroughly naturalised. It is somewhat difficult to obtain good reliable seed, although there is plenty of it. It falls from the panicles early, and is blown about by the wind. It is, where convenient, better to obtain a few roots and plant it in a field, where it will seed and spread itself very rapidly. It is a shade-loving grass, but grows in the open quite well; is fond of plenty of rain and heat.

ANDROPOGON SCHOENANHTUS (Lemon grass).—I may state that no grass of any kind does better in the Nursery than this scented one. It forms immense tussocks, rising high above the ground and completely covering it; handsome as an ornamental tussock grass, but does not or has not seeded with us. When cut down it soon springs up. A small quantity was sent to a local chemist, who extracted what he called a good essential oil. If a market could be found for this grass in a dry state, immense quantities could be grown at a trifling cost. It is distributed by the roots, and may be obtained in any quantity here by would-be growers.

GARCINIA MANGOSTANA (The Mangosteen from the Dutch East Indies).—This must be reported as a very slow-growing plant indeed. Plants now eighteen months old have only developed five pairs of leaves, and the plant a height of 4½ inches. Notwithstanding this slow growth, most of the thirty plants look fairly healthy. Four have been planted in the open, the rest are in the bushhouse. The plants are liable to a slow disease. The apex of one of the terminal leaves commences to dry, another opposite dies in the same way; this is followed by the drying up of the whole series of leaves and plant; it may be climatic influence. It has the reputation of being a very hard tree to naturalise in any country, and so far the same seems to apply here.

CESALPINIA CORIARIA (Divi Divi).—This tannin tree has been planted on the roadsides, and is just coming into flower for the first time. It promises to be a very prolific bearer of pods. The flowers are now showing in short panicles direct from the leaf-nodes of the branches. The trees suffer from high winds, and the branches require support, as they are very long and pendulous. It is a very pretty small tree. The fine pinnate leaves are very attractive. It is satisfactory to know that this valuable tree has flourished, so far, excellently.

STERCULIA ACUMINATA (Kola nut).—Eighteen of the first lot of these trees have survived, some of which have grown to a height of four feet and over. Although a *Sterculia*, this variety is *not* hardy with us, a large proportion having died right out. The plants have been planted in as different situations as the Nursery affords. I am in hopes, however, that some will survive and bear fruit, but am of opinion that cuttings from the larger trees of half-ripened wood would root under bell glasses, as some cuttings in open pots remained green for twelve months. Two tins of Kola paste were received privately by myself from Christy's, London. The highly stimulating properties reported were not appreciable, although it makes a pleasant drink.

CINNAMOMUM

The cinnamon of commerce grows and flourishes. Having with a view to obtain the marketable bark can hardly be cuttings with patience and care, even in open pots. Undoubtedly be more speedy and certain. Only two cuttings grew, one of which—a healthy plant—was taken to N. A. Carob.—Plants that were raised from seed in this year had a basal circumference of 11½ inches one foot from the growing tree.

This year the growth of summer indigenous grasses was very great, and advantage was taken of this growth, and an underground silo pit was excavated, the sides of which were of equal length. The grass was mown and carted to the pit, packed carefully and thoroughly rammed in with a heavy sleeper on the surface and barbed wire. Sawn sleepers were then placed on the top weighing two tons; this was roofed in with galvanised iron, and a drain was dug round on the surface to prevent inflow of rain water. The pit sunk in four weeks 1 foot 6 inches. The covering was then taken off, and the pit topped with maize stalks. This, up to time of writing, has only shrunk 2 inches. About 6 lb. of water were sprinkled when packing the grasses. Should this prove a successful essay it will be of great importance in this district, where large crops of natural and other grasses are obtainable in the wet season, when hay-making is almost impossible. The cleaning of the Luffa for sponges has been essayed. Some sponges of good colour have been reticulated. Specimens were forwarded to you, but better ones have since been obtained, and will be shown at the coming Cairns Agricultural Show, as there is, I believe, a market for them. I have already asked you to obtain, if possible, some seeds of a longer variety. The kind operated upon was the common Luffa of Chinese gardens, and which never exceed one foot in length.

Indigenous and introduced fibres were extracted and cleaned during last year. These fibres were exhibited at the Cairns Agricultural Show, and also obtained a second-class certificate at the Annual Brisbane Exhibition. It would seem our population is not sufficiently dense to furnish fibre separators. This is a national wealth revealed only, but not apparently to be worked on for some time. An exhibit was made at the Cairns Agricultural Show, consisting of specimens of roots, fruits, seeds, and economic subjects taken from the surrounding scrubs; this caused apparent gratification to the residents.

Maize for the horse when at work has been grown on Field No. 3 of Section No. 3. A gun and cartridges have been necessary to keep the persistent cockatoos from devouring it as it ripened. The white American maize does not yield so largely as the ordinary yellow variety. Some of the former will soon be ready for distribution. As will be seen by Schedule B (list of seeds and plants distributed), considerable interest has been taken in the Nursery work by the outside public, and quantities of seeds and plants have been distributed to all parts of the colony. A considerable number of inquiring letters have also been received, and ascertained facts given in reply. Certainly the value of the Nursery is increasing, and each arriving year should make it more so. Evidence of any probable value is carefully recorded in a daily journal, and from which this report is mainly taken.

I have, &c.,
EBENR. COWLEY.

SCHEDULE A.
METEROLOGICAL REPORT.

MONTH.	TEMPERATURE.				RAINFALL.		
	Maximum.	Minimum.	Extreme heat.	Extreme cold.	Wet Days.	Dry Days.	Inches.
June	78·7	64·3	82·8	47·2	16	14	2·693
July	76·8	59·2	81·5	45·0	13	18	1·472
August	81·5	59·8	81·5	49·0	4	27	0·503
September	85·4	63·8	88·5	53·5	2	28	0·128
October	88·0	69·9	91·5	61·5	10	21	1·408
November	90·5	69·5	94·0	65·0	10	20	1·939
December	93·8	73·0	100·0	67·0	15	16	4·110
January	94·0	73·0	102·5	62·8	11	20	11·483
February	92·1	74·5	100·8	65·5	12	16	8·512
March	87·3	71·5	97·0	67·5	21	10	14·540
April	87·0	68·1	90·5	63·0	...	30	0·045
TOTAL							46·832 in.

SCHEDULE B.

Summary of seeds and plants distributed by the State Nursery, Kamerunga, between 1st June, 1892, and 22nd April, 1893:—

Agave, 1; Albizzia canescens, 1; Albizzia stipulata, 1; Elæocarpus Bancroftii, 1; Elæocarpus grandis, 1; Alphitonia, 1; Anuotto, 2; Antidesma Erostre, 2; Balsam, 1; Bauauas, 29; Ban Linia, 1; Barringtonia racemosa, 2; Bauhinia, 12; Bœhmeria, 1; Broom millet, 5; Cabbage, 1; Caudle nut, 1; Cardwellia sublimis, 1; Cassava, 3; Castanospermum Australe, 1; Castanospora alphaudi, 1; Castor oil, 17; Chicory, 11; Chillies, 1; Cinnamon, 1; Citron, 3; Citronella grass, 1; Clerodendron, 3; Coconuts, 1; Coffee,

Coffee, 2; Cotton, 11; Cow pea, 36; Cucuma Australasica, 1; Davidson's plum, 1; Derris Koolgibberah, 1; Dhallruber, 3; Erythrina, 34; Fiji almonds, 5; Franchipancier, 1; Gardenia ovularis, 2; black, 12; Grain, horse, 16; Granadillas, 1; Haricot bean, 1; Honda, 1; Jabanicum, 1; Jacaranda, 3; Jack fruit, 3; Juta (red), 4; Juta (white), 4; Leucæna glauca, 1; Madagasear earth bean, 17; Maize (white), 1; Mall (B.N.G.), 1; Mangosteen, 1; Milo maize, 1; Monstera, 1; Mulberry, 6; tomentosum, 3; New Guinea grass, 1; New Guinea lablab, 2; New Guinea elegans, 3; Parsley roots, 1; Pearl millet, 4; Pineapples, 1; Poinc, 1; Ptychosperma, 1; Rhodomyrtus macrocarpa, 2; Rice, 45; Rose, 1; Sissoo, 3; St. John's bread, 8; Sugar-cane, 1; Sweet potatoes, 24; 48; Tetracera Cowleyana, 1; Texas millet, 18; Tobacco, 45; Turmeric, 1; juglans, 2; Wrightia millgar, 1; Yams, 22. Total, 720.

SCHEDULE C.

LIST of PLANTS, SEEDS, TUBERS, and CUTTINGS available for PRESENT DIS-
STATE NURSERY.

Plants.		Uses and Descriptions.
Name.		
Terminalia Catappa ... ..	..	An Almond tree; fine
Cumquat Orange ... ..	..	Small Orange tree; fine
Common Orange ... ..	..	Small tree; fruit.
N.G. Bananas ... ..	..	Two varieties, Barrego
Common Banana vars. ... ..	..	Dacca, Sugar, Cavend
Citronella ... ..	..	Perfume grass.
Panicum max. ... ..	..	Large grass for stock food.
Cuttings.		
White Mulberry ... ..	..	Food for silkworms.
Sweet Potato ... ..	..	New from Dalrymple Island.
Frangipani ... ..	..	For extraction of perfume.
Erythrina, red ... ..	..	For ornamental purposes.
Duranta, blue ... ..	..	Hedge plant.
Japan Orange ... ..	..	" "
Bauhinia var. ... ..	..	Ornamental small tree.
Seeds.		
Broom Millet ... ..	..	Broom-making.
Cow Pea ... ..	..	Fodder (green), manure, &c.
Kaffir Corn... ..	..	" seed for stock and poultry.
New Guinea Tobacco ... ..	..	Delicate-leaved tobacco.
Safflower ... ..	..	Oil seed; flowers dye.
Cotton ... ..	..	Cotton fabric.
Natal Red Grass ... ..	..	Excellent grass; stands drought.
Castor Oil ... ..	..	Useful oil.
Maize ... ..	..	White American corn.

To follow later in the Year.

Yams, of several varieties (tubers); Sweet potatoes, two forms (tubers); Turmeric Cassava; Boehmeria nivea, root plants; Pineapple, plants; Indigo, seeds; Tobacco; Kaffir Corn, seed; Rice, varieties; Broom Millet, seed; Teosinte, seeds; Safflower; Bananas, six varieties (plants); Sissoo Tree, root plants; Jaffa Orange, grafted trees; Sweet Orange, seedling plants; Cumquat Oranges, plants; Common Orange, seedling plants; White Maize, seed; White Mulberry, cuttings; Citronella Lemon Grass, roots; Gingelly, seed; Pearl Millet, seed.

SCHEDULE D.

LIST of ECONOMIC PLANTS growing in the STATE NURSERY, KAMERUNGA, 1892-3.

Botanical Name.	Vernacular Name.	Use.	Botanical Name.	Vernacular Name.	Use.
Citrus limella	Lime	Acid juice for driuks	Musa, var. aiva	Banana	Fruit
Sterculia acuminata	Kola	Beverage	" karua	"	"
Coffea Arabica et Liberica	Coffee	"	" siskomu	"	"
Artocarpus incisa	Breadfruit	Breadfruit	" konoboro	"	"
Theobroma cacao	Cocoa	Beverage	" garokoni	"	"
Curcuma longa	Turmeric	Curry colouring	And 21 other varieties from	"	"
Citrus variety	Citron fruit	Citron fruit for preserve	Mabudauan, British		
Zea mays	Corn	Corn for food (white)	New Guinea		
Gossypium	Cotton	Cotton manufacture	Vitis tona	Grape	"
Ricinus communis	Castor oil	Castor oil for medical use	" black Spanish	"	"
Bixa orellana	Arnotto	Dye and fibre	Punica granatum	Pomegranate	"
Diospyros kaki	Date plum	Date plum fruit	Panicum texienicum	Texas millet	Fodder
Cæsalpinia sappan	"	Dye, &c.	Panicum teneriffæ, var. rosea	Natal red grass	"
Abutilon periplocifolium	Abutilon	Fibre	Panicum maximum	Guinea grass	"
Agave rigida, var. sisalana	Agava	"	Phaseolus maximum	Green grain	"
Boehmeria nivea	Ramie	"	Physalis peruviana	Cape gooseberry	Fruit
Corchorus olitorius... ..	Jute	"	Tornelia fragrans	Monstera deliciosa	"
Vigna sinensis	Cow pea	Fodder	Fourcroya gigantea	Agave	Fibre
Andropogon saccharatus	Kaffir corn... ..	"	Citrus varieties	Orange, sweet	Fruit
Musa, var. superba	Banana	Fruit	"	" egg	"
" cavendish	"	"	"	" Jaffa	"
" sugar	"	"	"	" blood egg... ..	"
" dacca	"	"	"	" myrtle-leaved	"
" barrego... ..	"	"	"	" mandarin	"
" sossido	"	"	"	" Mozambique	"
" gidavau	"	"	"	" Bahia navel	"
" radjaserch	"	"	"	" Seville	preserve
" tanvek	"	"	"	" seedless	"
" djawa	"	"	"	" chrysanthemum	"
" bigu	"	"	"	" Chinese	"
" dau	"	"			
" deriuri	"	"			

SCHEDULE D—continued.

growing in the STATE NURSERY, KAMERUNGA, 1892-3—continued.

Use.	Botanical Name.	Vernacular Name.	Use.
Fruit	Carthamus tinctorius ...	Safflower ...	Oil
"	Avena sativa ...	Oats ...	Oats for food
"	Elæis guineensis ...	Oil palm ...	Oil, &c.
"	Andropogon Schoen. ...	Lemon grass ...	Perfume
"	Solanum tuberosum ...	Potato ...	Potato, vegetable
"	Ananas sativa ...	Pineapple ...	Pineapple fibre, as well as fruit
"	" " ...	Smooth-leaf pine-apple ...	Pineapple fibre, as well as fruit
"	Capsicum annum ...	Chilly ...	Pepper
"	Manihot glaziovii ...	Rubber ...	Rubber
"	Ficus elastica ...	" " ...	" "
" and fodder	Oryza sativa ...	Rice ...	Rice food
"	" jung mera ...	" " ...	" "
"	" Saigon ...	" " ...	" "
"	" Chinese Hill ...	" " ...	" "
" fibre	Luffa ...	Vegetable sponge ...	Sponges
"inger used as spice or preserve	" pentandra ...	" " ...	" "
"ain for food	Cinnamomum verum ...	Cinnamon ...	Spice
"edge plant	Morus alba ...	White mulberry ...	Silkworm food
"	Dalbergia sissoo ...	Sissoo ...	Timber
"	Cucumis utilissimus ...	A cucumber ...	Vegetable and delicious fruit
"emp for ropes, &c.	Cæsalpinia coriaria ...	Divi Divi ...	Tannin
"edge plant, flowering	Hibiscus edulis ...	Okra ...	Vegetable
"orse fodder	Colocasia esculenta ...	Taro ...	" "
"adigo for dyeing purposes	Dioscorea ...	Yam panna ...	" "
"	" " ...	" uvi ...	" "
"	" " ...	" fortuna ...	" "
"	" " ...	" Trobriand ...	" "
"	" " ...	" potato ...	" "
"	Triticum vulgare ...	Wheat ...	Wheaten flour
"	Dolichos sinensis ...	Long beans ...	Vegetable
"	Carica papaya ...	Paw paw ...	Fruit

REPORT OF MANAGER OF TRAVELLING DAIRY No. 2.

SIR,—I have much pleasure in forwarding you an annual report of the work and teachings of the Travelling Dairy No. 2 at the various places visited by me from 12th March, 1892, to 31st May, 1893:—

Eighteen places have been visited and 302 pupils instructed during that period, and I feel gratified in stating that the greatest success has been achieved at each place throughout the entire course of my instructions.

RAVENSWOOD.

Operations were commenced here on 23rd March, 1892, and carried on successfully for the usual ten days. During the operations instructions were imparted to eighteen pupils, all taking the greatest interest in acquiring knowledge from my tuition.

The weather was very warm, the temperature reaching as high as 100 degrees in the building, notwithstanding which I succeeded in turning out an excellent quality of butter.

Some of the dairymen, who were of an opinion that it was impossible to make a good keeping quality of butter at this season of the year, packed the butter made by me, and kept it for six months; at the end of which period the butter was found to be of excellent quality. This fact fully demonstrated that with skill and good appliances a first-class article can be manufactured at all seasons in the warmest parts of the colony.

The visit of the Dairy to Ravenswood has resulted in benefiting the farmers to a great extent. Several dairymen hitherto prejudiced against innovations were among the first to avail themselves of the advantages to be derived from the Dairy, and procured new appliances.

The art of cheese-making here previous to the arrival of the Dairy was almost unknown, and I am pleased to state that this branch of dairying is now carried on by many of the people.

Cheese made by me here was pronounced by all to be excellent.

One of the largest dairymen in the district complains that the Dairy has injured him considerably by teaching everyone how to make good butter, and consequently preventing him from placing this article at an exorbitant price, as was the case previously.

The system of dairying in the Ravenswood district is very primitive—the cows being milked once a day, and the calves allowed to suck their mothers. No care is exercised in selecting a suitable class of cow, and any animal in the shape of a cow, provided she give a pint of milk, is considered good enough; the average return of butter being 1 lb. per cow per week.

The cows are milked until they reach a low stage of condition, when they are turned out and replaced by others.

No fodder of any description is provided. The quality of the milk treated here was on an average good, as are also the grazing capabilities of the land in favourable seasons. Agriculture is altogether out of the question, owing to the poor hungry nature of the soil.

KIRK RIVER.

Commenced operations here on 11th April, and carried on for the usual period. Twenty pupils were instructed, all being persons interested in dairying, and who purposed putting the knowledge gained into immediate practice.

My

that those of the farmers who were most prejudiced against modern
to secure them.
visit seems to have been the rousing of the farmers up and showing them
been asleep for years, while their neighbours in the South have been
vale, the advantages for successful dairying are innumerable, and the
that could be desired.
repeated co-operation, my efforts were futile, owing to the petty jealousy
taken root among the farmers, and which precludes everything in the
place at present.
farmers here, as a rule, is that the man who happens to own a few cows
considers himself so much better, and with connection with him.

MOOMBRA.

1st September and finished on 12th September.
daily, and paid every attention to the instructions imparted.
is in every way suitable for dairying purposes, at the time of my visit a
density of the milk considerably.
the effects of the Dairy here, I am satisfied that many of the farmers
thereby.
for the purpose of establishing a co-operative factory, but, owing to the
the idea had to be abandoned—at least, for the present.

ESK.

Commenced work here on 19th September and finished on 28th September.

The most lively interest was taken in the work done, not only by the pupils, of whom there were
seventeen, and the farmers, but also by the business people of the place and others.

Many of the pupils came from a long distance, and each and all manifested the most earnest
desire to learn as much as possible.

Judging from what I saw, on arriving here, of the dairying industry, it appeared to me to be in its
infancy—at least, as far as the system, appliances, &c., were concerned. And a similar condition of
things is likely to continue unless the fossilized ideas of the people undergo a change, or an influx of
enterprise, in some shape or form, takes place. The quality of the milk treated here was very inferior,
owing mainly to the cows having just been broken in for the purpose of supplying the Travelling Dairy,
and on several occasions it came under my notice that the cows were chased for some distance by a fast
horse, before being yarded, which in itself was sufficient to damage the milk and render the turning out
of a good cheese from that day's milk almost impossible. The natural grasses are good, and the land
would produce fodder in abundance. Yet nothing in that direction has been done.

On 3rd, 4th, and 5th October, I visited Mr. Williams' place, near Cressbrook, and there instructed
several people concerned in cheese-making. The object of my visit was to enlighten some farmers who
had attempted cheese-making, and were not as successful as they had anticipated.

Cheese is the principal dairy product; the difficulty of reaching the market interfering with the
manufacture of butter.

MARBURG.

Commenced work here on 10th October, and concluded on 31st October.

Owing to the large number of pupils nominated by the committee, it was deemed necessary to
carry on a double course of instructions. Altogether twenty-eight pupils attended the lessons given, and,
being deeply interested in dairying, were most anxious to acquire a thorough knowledge of it in all its
branches.

Whilst here, several meetings of the farmers were held with the object of promoting the
co-operative factory system, but through the scarcity of money and the want of that amount of energy
necessary to start an industry out of the groove they were accustomed to work in, it fell through.

The butter manufactured here is little better than cart-grease. It is collected in small quantities
by the storekeepers—the average price being about 3d. per lb.; and it often occurs that the producer
cannot dispose of it at any price, which is not at all surprising considering its bad quality. The land is
everything that could be desired for agriculture and dairying. The settlement here is denser than in
many of the places I have been. Though a large quantity of hay is grown, for which the farmer nets
but a few shillings in return, yet he seems to lose sight of the fact that it would be greatly to his
advantage to use it for milk-producing purposes.

Since my arrival in the district, I am informed that as the result of my teaching, the farmers have
benefited immensely, and that good cheese is now being manufactured by them. The farmers have
decided on going in for milk-producing on an extensive scale, and supply a private firm until they are in
a better position to co-operate.

FASSIFERN DISTRICT.

Operations were commenced here on 11th November—Purga, Milbong, Mount Flinders,
Teviotville, Danalgin, Engelsburg, and Boonah being visited in the order named.

In all, 121 pupils received the usual course of instructions.

On my visiting the district first, only one application had been made for the services of the Dairy;
but the farmers, soon discovering the advantages arising from it, made application to have it stationed at
the above-mentioned places. It is gratifying to me to be able to state that the unanimous opinion of all
is that the action of the Government in sending the Travelling Dairy to the district was most
praiseworthy, and that a great boon had been conferred on all interested in dairying, which could hardly
be accomplished in any other way. While travelling through the district I attended several meetings
convened for the purpose of introducing the co-operative system, and explained the principles and
advantages of the same; but I am sorry to say that, owing to selfishness or lack of energy, nothing has
yet been done in that direction.

It

My services were very much appreciated here, and I feel compensated from my visit. The farmers are now carrying on dairying on a small scale. The system of milking and dairying, in general, is similar to that of the North of Queensland.

RAVENSWOOD JUNCTION.

Commenced work here on 2nd May, and kept going for the usual period. It was taken in the work by all concerned. Nineteen pupils received a course of instruction, and were people interested in the matter, and expressed their appreciation of the instruction.

Dairying here is carried on on a very small scale, and only at certain seasons. Butter is selling at a high price. When the price falls below 9d. per lb. the soil is very inferior. The quantity of milk is better than the quantity, the quality is about two quarts daily. The relation between the milkman and the calf exists. The dairy buildings are most primitive, anything in the form of a building. The Dairy has been the means of inducing several of the farmers to procure suitable appliances, which will enable them to go in for dairying more extensively.

WOODSTOCK.

The usual course of instructions were commenced here on 20th May. Eleven pupils attended. Owing to the continual wet weather rendering it impossible of taking advantage of instructions given; consequently it is to be regretted that it was not so beneficial as otherwise it might have been.

Dairying, combined with agriculture, is carried on here to a considerable extent. Dairying is far from what it should be, no fodder being provided and the calves are left to their mothers.

This concluded my tour in the North of Queensland, which, on the whole, may be considered a most satisfactory one.

The opinion of the people themselves, and, without an exception, confirmed by the Press, is that all unanimously agree the knowledge gained from the services of the Travelling Dairy is inestimable. I feel confident that what I have taught them will be most beneficial to the farmers (which they freely admit), also the whole of the colony, as being the means of keeping out the imported article.

I strongly advocated the co-operative system of dairying at all times; but, with few exceptions, there is little hope for that sort of thing for some time on account of the farmers being too sparsely settled.

The factory system could be worked to great advantage in Bowen, where there is a large number of dairymen, but not under the existing state of affairs. The farmers never provide fodder for the cattle, and thus could only supply milk for about seven months in the year; and then the seasons would require to be favourable.

In conclusion, I may say that the feeling of petty jealousy existing between the farmers will render all attempts at co-operation abortive, and tend towards making what in the Southern colonies is a thriving institution here almost an impossibility.

SOUTHERN QUEENSLAND.

Arrived in Brisbane 9th June, 1892. After having Dairy plant overhauled and painted, it was removed to the Brisbane Valley district, where a most successful course of instruction was gone through. Five places were visited and sixty-five pupils instructed.

WIVENHOE POCKET.

Commenced work on Monday, 4th July. Nine pupils were instructed, all evincing the greatest interest in the proceedings. Owing to the space in the buildings in which operations were carried out being insufficient to accommodate more than a limited number of pupils, some intending learners lost an opportunity which otherwise might have benefited them.

FERNVALE.

At work here from 21st July to 1st August. During my stay twelve pupils were instructed, and the proceedings were watched most attentively. As was the case in most places visited by me, the art of cheese-making here was almost unknown, and whenever anything of the kind had been attempted the appliances were of the rudest description. Since leaving, I am informed, many of the farmers are turning out cheese largely and of superior quality. The undivided opinion of the people is that the Government, by sending the Dairy to the district, has conferred an everlasting benefit on the farmers residing there. During my travels I have never seen a district where the facilities for making cheese and butter are so great. The soil is extremely rich, and capable of producing an abundance of fodder either natural or artificial. I feel sure that in the near future dairying will be one of the leading industries in this district. At Lowood, in the near vicinity, there is a factory worked by a private company, but it is very poorly patronised by the farmers. There is also a private creamery at Ferndale, but it can only take a limited quantity of milk.

While staying here I addressed a meeting of the farmers, strongly advocating an improvement in this system of dairying, and pointing out the advantages that must follow co-operation. I found the farmers most eager to acquire information and to take the fullest advantage of the instructions given them. But I am sorry to state that here, as in many other places, want of unity is the great drawback, and nothing so far has been done in the way of establishing either a creamery or a factory.

DEEP CREEK, MOUNT BRISBANE.

Operations were commenced here on 15th August, and went on without interruption for the usual period.

Sixteen pupils were instructed, all of whom took the greatest interest in the work. Dairying here is carried on extensively, but the system is altogether behind the times. The farmers seemed content to go on in the old-fashioned method, and with appliances that have long since been considered antiquated. I have much pleasure in attesting to the fact that with many of the farmers the Dairy has revolutionised their mode of working prior to my visit, and that now a considerable quantity of first-class cheese is being made.

It